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NEW ZEALAND
JOURNAL OF

# AGRICULTURE

SEPTEMBER
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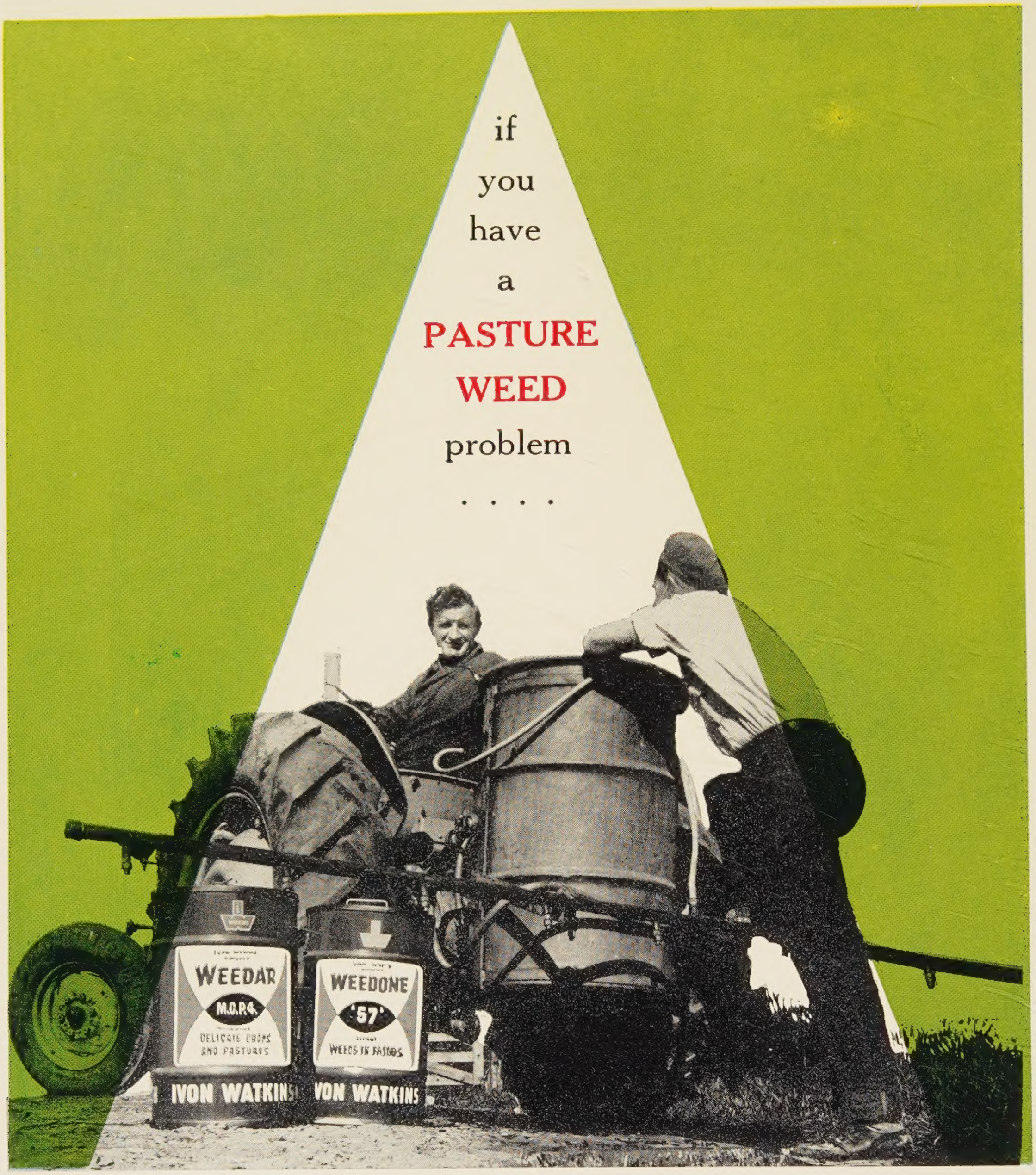
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# Journal of Agriculture

Vol. 101 No. 3 15 September 1960

Editor: G. J. Neale P.O. Box 2298, Wellington

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A pleasant reach of the Motueka River at Ngatimoti is shown on our cover. The favourable climate of the Motueka district has led to the growing of market garden crops, hops, and tobacco. Water from the Motueka River is widely used for overhead irrigation, particularly of tobacco.

[*Ellis Dudgeon photograph*

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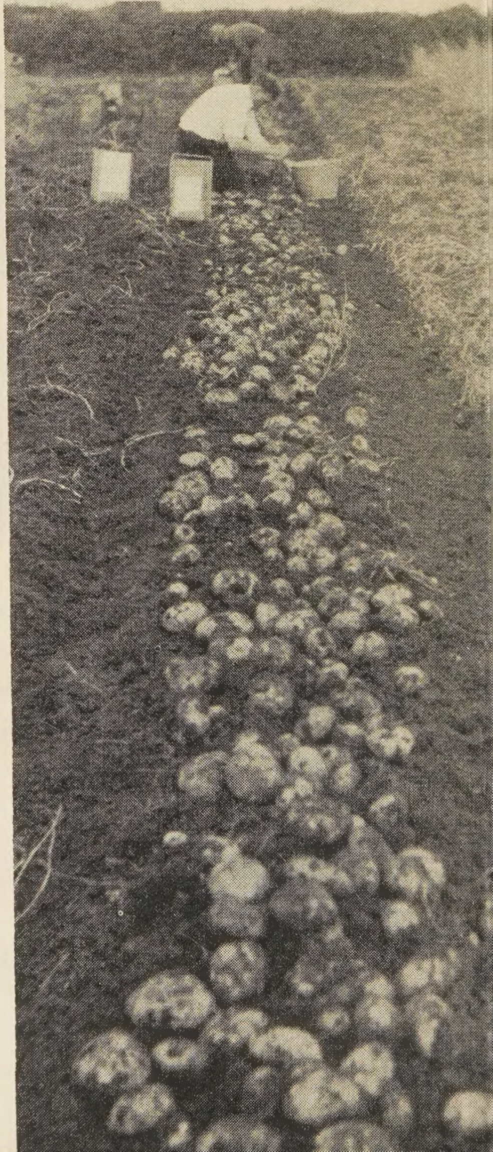
# TAHI and RUA

# Two New Potato Varieties

By C. M. DRIVER,
Principal Scientific Officer,
Crop Research Division,
Department of Scientific and
Industrial Research,
Christchurch

POTATO growing in New Zealand developed with the use of varieties bred in other parts of the world, notably Britain and the United States of America. Though these varieties have given satisfactory yields when conditions have been suitable, our climate varies considerably during the season and from year to year, so that yields have been extremely variable. This has resulted in marked fluctuation in the price level, and consequently potatoes have been a chancy crop.



THERE has been an attempt in recent years to replace the imported varieties with ones bred in New Zealand and already four are available, namely Glen Ilam, Ilam Hardy, Constellation, and Southern Cross, all bred by private plant breeders. This paper announces the first two varieties bred by the Crop Research Division of the Department of Scientific and Industrial Research at Lincoln.

## Potato Breeding

Potato breeding began at Lincoln in 1937 but ceased during the war and began again in 1948. The aim has been to produce varieties which could be relied on to give a good yield under a wide range of conditions, to be resistant to blight, and to be of acceptable market and eating quality.

While the two varieties described here are unlikely to meet the requirements of every district, they show sufficient promise in many areas to warrant release to growers. Limited quantities are being released by the Department of Agriculture for planting in spring 1960 by experienced seed potato growers in the better seed growing areas.

## Description of Varieties

### Tahi

Tahi was selected from a cross made in the 1949-50 season between the well known variety Sebago and the American hybrid variety Harford. Harford was selected under the United States

← Tahi on light soil at Darfield in a moderately dry season (1958-59) gave 29 tons an acre.

Rua alongside the Tahi gave 25 tons an acre. →

Department of Agriculture breeding programme as a blight resister. It will give high yields, but is of indifferent quality and is grown only in some of the Caribbean islands. However, in crosses it has thrown some very good progenies. From cross number 162 a number of seedlings were selected, one of which, designated 162.02, was finally selected as a new variety. As this was the first hybrid potato to be marketed by the Crop Research Division, it was named Tahi, the Maori word for one.

The foliage is tall and strong and stands up to severe winds. Smothering of weed growth is good, drought resistance is high, and in trials to date it has been free from potato blight. As the foliage matures it may sometimes be attacked by the so-called early blight fungus, but it is no more susceptible than the varieties at present in use. Tahi generally establishes quickly and well. It will stand plenty of moisture until near harvest time, but will not tolerate a wet, badly drained soil as the tubers ripen.

Tahi is a late variety, slightly later than Dakota Red, and it may be too late for planting from Dunedin southward. Under conditions of vigorous growth haulm destruction may be advisable to hasten maturity. Unless the tubers mature fully, they may need extra care in harvesting to avoid digger damage. When grown to maturity on medium to light country a good firm skin is formed rather like that of Katahdin.

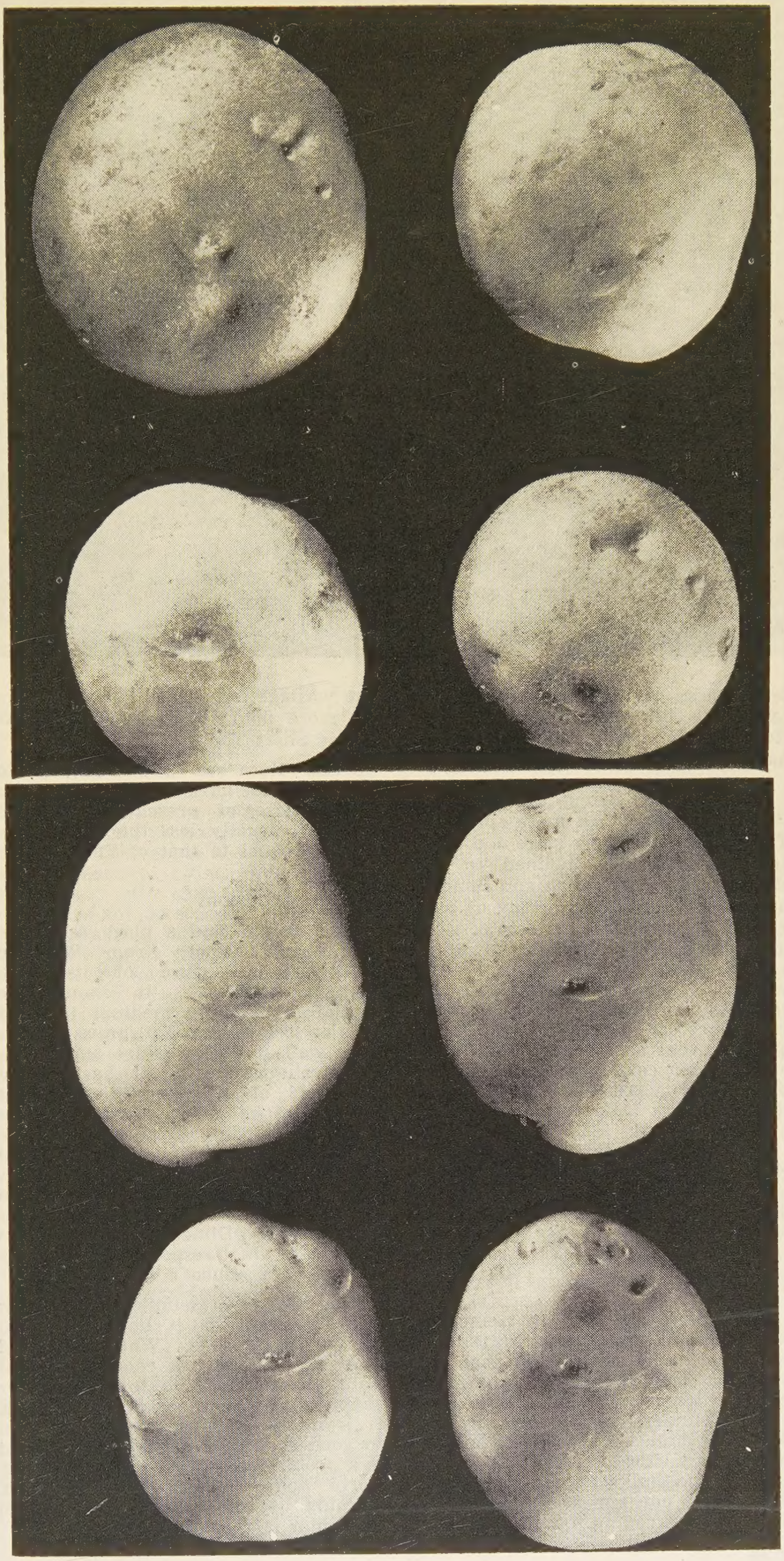
The tubers are round and rather flat with shallow to medium-shallow eyes. Second growth is rare, but under irregular growing conditions the eyes at the apical end may be deeper than usual and a hollow may develop at the heel end. Tahi produces tubers of medium size with a high proportion of table potatoes. After a dry spring some oversize tubers may be produced. The tubers are resistant to hollow heart and appear to be resistant to brown fleck. The skin is white, inclined to be soft on immature tubers, but quite firm when mature.

Tahi keeps well, wastage is usually low, and the cooking quality when mature is somewhat like that of Katahdin or Auckland Short Top. Immature potatoes are waxy.

When Tahi has been allowed to grow to maturity the yield has been outstanding.

### Rua

Rua was selected from a cross between Katahdin and Harford made in the 1949-50 season. From cross number 155, one seedling appeared outstanding and this has appeared as hybrid 155.05 in trials over the past



UPPER: Tubers of Tahi.
LOWER: Tubers of Rua.

▲ The trial area at Palmerston North where crops of 40 tons an acre were obtained from Tahi.

few years. As this was the second hybrid to be released by the Crop Research Division, D.S.I.R., it was named Rua, the Maori word for two.

The foliage is strong, though less so than Tahi, and much more spreading. The leaflets are fairly large and under adverse conditions inclined to roll. However, they are tough and stand up to strong winds. Smothering of weed growth is good. Rua is fairly resistant to drought, very resistant to blight, and resistant to mild mosaic. It is sometimes slow to emerge and may come up erratically, but usually final emergence is good and the stand quickly evens up. Occasionally misses occur under cold, wet conditions and the variety is possibly a little susceptible to attack from corticium.

Maturity is late, though slightly earlier than for Tahi and about equal to that for Dakota. While haulm destruction can hasten maturity, further trials are needed before Rua can be recommended for Otago-Southland.

The tubers are oval to round-oval with shallow eyes and white skin, which is firmer and thicker than that of Tahi. The size is usually medium with a high proportion of table potatoes, but under irregular growing conditions or after a dry spring some large tubers may develop. Second growth is rare and hollow heart and brown fleck have not appeared in trials to date. The keeping quality is good. The wastage is low and cooked tubers are more floury than Tahi or Aucklander Short Top.

When Rua has been allowed to mature, yields have always been much above those of present commercial varieties, usually less than but occasionally equal to that of Tahi.

## Recommendations

Tahi should find a place as a late main crop variety from Waimate northward. Because of its high drought resistance, it should be specially suited to medium to light soils or to lower rainfall areas. It has done well at Willowbridge and in the Manawatu where blight has limited the yield of other varieties, but it should not be grown where there is a risk of flooding in autumn. While some heavy yields have been obtained in the early potato growing areas round Auckland, it may not be fit to dig quite as early as Ilam Hardy or Arran Chief. Difficulty has been experienced in resprouting quickly enough to produce a second crop.

Rua may have a similar distribution to Tahi, except that it should be grown on the better soils. While the yield may be only 80 per cent of that of Tahi, the tubers tend to be a better shape and of a more floury texture. It is likely to be grown on medium to good soils in districts where blight is a problem and where good keeping, fairly floury potatoes are required. Dipping seed tubers to control corticium is recommended.

## Yielding Ability

Under very good growing conditions on a good soil yields of up to 35 to 40 tons an acre have been obtained with these varieties. It should be emphasised that some of these yields were obtained under extremely good conditions and may not be obtained in practice. Nevertheless, yields of up to 30 tons an acre have been obtained under farming conditions on a light soil in a moderately good season in Canterbury, and as much as 16 tons an acre under very dry conditions when the top commercial variety yielded 8 tons.

## Conclusion

Possibly the greatest value of the new varieties, especially Tahi, is their ability to yield consistently from year to year. Of most importance has been drought resistance in Canterbury and blight resistance in the Manawatu and South Canterbury. Lateness may limit their usefulness in some areas, though with the advent of pre-harvest defoliation this may no longer be a problem.

**Acknowledgments**

Thanks are due to farmers who have co-operated in providing land and assistance to grow breeding plots, to the Department of Agriculture, the Grasslands Division, D.S.I.R., Palmerston North, and the Vegetable Section of the Crop Research Division, D.S.I.R., Otahuhu, for conducting trials and to staff at Lincoln who have helped in the breeding projects. Dr R. S. Duff, Director of Canterbury Museum, suggested the names.

## Ruakura Experiment in

# Milking Management

## Gives 32% Production Gain from 30 Sec Pre-milking Hand Stimulus

**A SUBSTANTIAL increase in dairy cows' milk production (32 per cent in a Ruakura experiment) and reduction in milking time can be expected from the practice of a 30 second wash and hand stimulus of the lower udder and teats before milking, as against a system where the machine is relied on to produce the let-down stimulus. This finding and results of attempts to measure other factors in cows' milking behaviour were announced to the Ruakura Farmers' Conference in June by D. S. M. Phillips, Senior Principal Scientific Officer, Department of Agriculture's Ruakura Animal Research Station, in a paper to the conference and at a demonstration at the Station's No. 1 Dairy during the conference field day. An adaptation of the paper follows.**

WITH hand milking there was no need for a pre-milking stimulus, as the act of milking itself constitutes a very vigorous and prolonged stimulus. The pre-milking wash served no other purpose than to cleanse the teats and lower udder of dirt.

The advent of machine milking has changed the picture to some extent. Because of the use of the high vacuum for milking, the machine is undoubtedly much less comfortable and stimulating than hand milking and does the job in a much shorter time.

In New Zealand it has been the practice to wash the cow briefly before machine milking because of the frequently muddy surroundings and the need for preventing dirt entering the machine. This wash has, generally, been somewhat perfunctory and little attention has been paid to its possible importance as a stimulus to let-down.

The development of the let-down theory in recent years and the introduction of the conditioned reflex theory of let-down have made it apparent that the use of a vigorous wash as a direct stimulus to let-down may be very desirable.

In practice many farmers have relied on "starting", or a short period of hand milking before machine milking, to facilitate the milking of some of the more difficult cows, and the efficacy of this practice has suggested that a good "hand-induced" let-down before machine milking will often prevent slow or incomplete milking.

For some years now a vigorous wash has been advocated, but to date there has been no conclusive evidence that it would affect production. In 1956 W. G. Whittlestone carried out a full lactation experiment at Ruakura using identical twins to measure the effect of pre-milking stimulus on total production. This experiment, using five sets of identical twins, compared the production of cows which were stimulated for 30 seconds immediately before machine milking with that of their twin mates who were not stimulated in any way before the teat cups were put on. The average within-set difference was 18 per cent in favour of the stimulated cows, but because of the large variability in response between twin sets the results were not conclusive. The responses to the treatment varied from —2 per cent to 36 per cent.

In view of the inconclusive nature of this experiment it was decided to repeat it on a larger scale and at the same time to attempt to measure any other possibly relevant factors associated with the cow's milking behaviour which might provide some reason for the very large variation in the response of individual twin sets to the treatment.

### Description of the Present Experiment

For the purposes of the experiment 13 sets of identical twin cows were used. One set was subsequently not included in the result because of a very short lactation. One member of each set was stimulated and the other was not. The treatments were as follows:

**Stimulated cows:** The cows were washed for 30 seconds immediately before the cups were put on. The wash consisted of hosing with cold running water and rubbing with the

### Conclusions

THE experiments with the 30 second wash and hand stimulation of the lower udder and teats before milking made the following points evident:

1. The use of a pre-milking hand stimulus of 30 seconds can result in a substantial increase in production as against a system where the machine is relied on to produce the let-down stimulus. The increase in production in the present experiment amounted to 32 per cent for the well stimulated group.

2. It is clear that some cows are much reduced in production by lack of stimulus while others are comparatively little affected.

3. Those cows with a poor let-down response appear to be the most affected in their production by a lack of stimulus.

Unfortunately, it is not possible yet to distinguish readily between these two types of cows in the field, though it is hoped that tests may be devised for field use.

4. The reduction in milking time for the well stimulated cows will more than make up for the extra time spent on the wash stimulus.

There can be little doubt that the increased production resulting from the use of an adequate pre-milking stimulus, with the reduction in milking time, will make its introduction very worth while.

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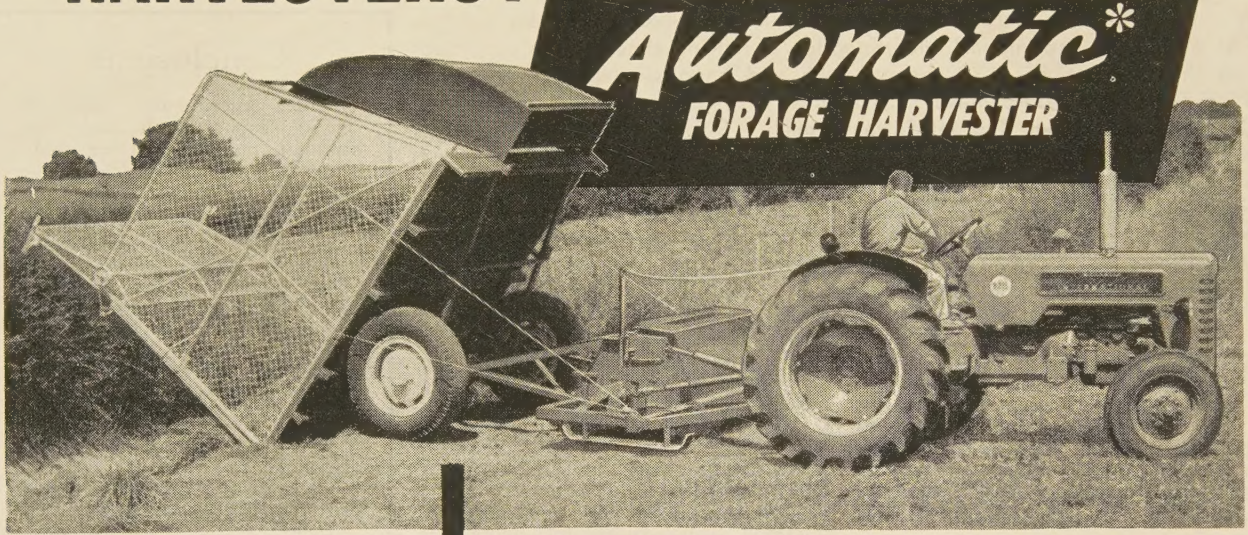

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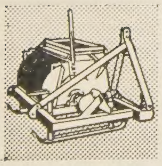

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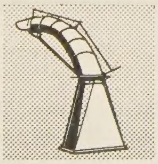

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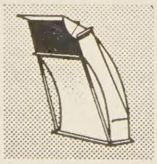
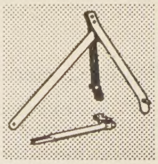


Fixed Chute



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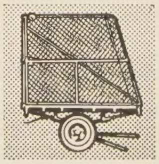

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hand, followed by massage of the teats and lower udder and squirting of each teat.

**Non-stimulated cows:** The non-stimulated cows were not given any stimulus to the udder before the cups were put on, the only stimulus to let-down being that produced by the machine. The cows were bailed up in the normal way and when the next cow was finished the cups were put straight on without any wash or other preparation.

All cows were milked normally in a herd of approximately 65 cows and were taken into the bail in any order.

A four-cow single Ruakura machine was used, with the vacuum set at 15 in. of mercury. The pulsation was set at 40 per minute with a reduced squeeze giving approximately 30 per cent full air pressure.

A weight of 3½ lb was used on the claw at the end of milking for machine stripping; it was applied when the sight glass started to clear and continued until the cow was finished.

## Results of Experiment

The milk from each cow was weighed at each milking and samples for fat test were taken weekly.

The average production figures for the 12 sets of twins given in Table 1 show large differences between the two treatments.

TABLE 1—EFFECT ON PRODUCTION OF 30 SEC PRE-MILKING STIMULUS (AVERAGE 12 SETS OF TWINS)

| Group | Milk gallons | Fat lb | Days | Fat percentage |
|---|---|---|---|---|
| 30 second stimulus .. | 5,850.5 | 294.9 | 250 | 5.04 |
| Non-stimulated | 4,405.5 | 223.3 | 203 | 5.07 |
| Difference .. | 1,445.0 | 71.6 | 47 | — |
| Difference per cent of non-stimulated .. | 32.8 | 32.0 | 23.2 | — |
| Difference per cent of stimulated | 24.7 | 24.2 | 18.8 | — |

The average differences in the fat and milk are given as a percentage of both the stimulated (30 second wash) group and of the non-stimulated group, because though the 30 second wash and stimulus is standard practice at Ruakura, it may well be that the "non-stimulation" treatment is closer to the practice of many farmers. The percentage difference is the increase due to the use of the wash stimulus.

**It is apparent from the present experiment that the use of a 30 second wash stimulus for milking increased the production by an average of 71 lb of butterfat or 32 per cent.**

The average butterfat test was the same for both groups. The average lactation curves for the two groups in Fig. 1 show very little difference for the first 50 days of lactation. Thereafter the non-stimulated group fell rapidly. The apparent improvement at the end of lactation is due to the fact that only the higher producers were left in each group.

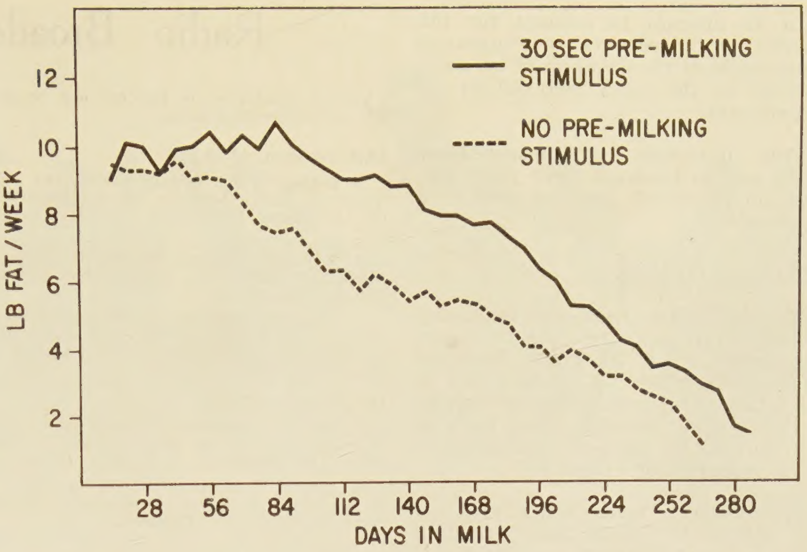

Fig. 1—Weekly fat v. days in milk.

## Milking Times

The effect of the washing on milking rates and times was quite marked (Table 2). The rate of milking in pounds of milk per minute was much higher for the stimulated cows.

TABLE 2—EFFECT OF WASHING ON MILKING RATES AND TIMES

| | Stimulated | Non-stimulated |
|---|---|---|
| Milking rate, pounds per min .. .. | 3.0 | 2.3 |
| Average milking time, min .. .. | 4.05 | 4.35 |
| Milking time for normal production, min .. | 3.9 | 5.1 |

Milking times averaged 20 seconds shorter for the stimulated cows, but these cows produced 32 per cent more than their non-stimulated mates. If the milking times are calculated on the basis of the milk produced by the stimulated cows, they would be as shown, that is, 3.9 minutes for the stimulated cows and 5.1 minutes for the non-stimulated cows. This represents a reduction of nearly 1¼ minutes' milking time per cow due to the use of the wash stimulus.

## Influence of Let-down on Response to Wash Stimulus

The individual production figures for the cows (Table 3) show that the different twin sets responded in different ways. Some showed a large difference in production and others a very small difference. This same effect was noticed in the earlier experiment.

TABLE 3—EFFECT ON BUTTERFAT PRODUCTION OF PRE-MILKING STIMULUS

| Twin numbers | Total fat (lb) Stimulus | Non-stimulus |
|---|---|---|
| 701-2 .. .. .. | 335.3 | 113.1 |
| 601-2 .. .. .. | 216.3 | 38.1 |
| 661-2 .. .. .. | 246.4 | 84.6 |
| 667-8 .. .. .. | 199.7 | 63.0 |
| 657-8 .. .. .. | 388.4 | 290.5 |
| 603-4 .. .. .. | 273.4 | 184.1 |
| 663-4 .. .. .. | 373.6 | 320.9 |
| 673-4 .. .. .. | 328.4 | 330.9 |
| 669-70 .. .. .. | 256.7 | 268.0 |
| 817-8 .. .. .. | 145.3 | 161.4 |
| 743-4 .. .. .. | 460.0 | 477.2 |
| 627-8 .. .. .. | 314.7 | 332.5 |

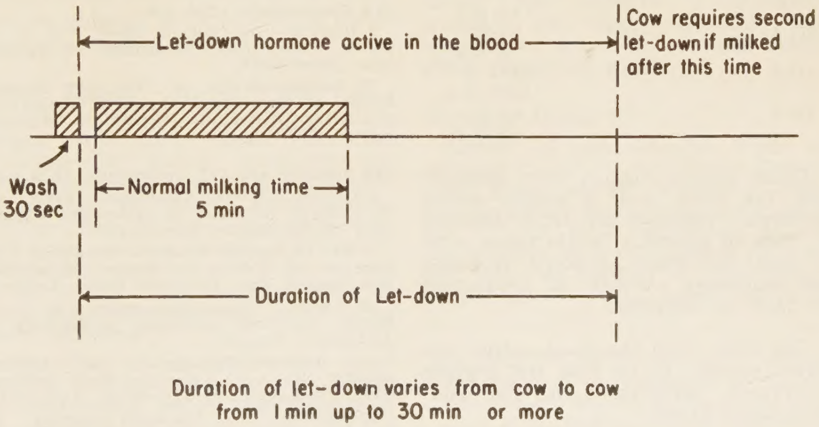
Let-down hormone active in the blood
Cow requires second let-down if milked after this time
Wash 30 sec
Normal milking time 5 min
Duration of Let-down
Duration of let-down varies from cow to cow from 1 min up to 30 min or more

Fig. 2—Duration of let-down.

In an attempt to account for this variability in response, measurements were made of the duration of let-down activity in the cows involved in the experiment.

This technique of measurement, developed at Ruakura some years ago, had not previously been applied on a large scale.

### Duration of Let-down

The measurement is best explained by Fig. 2. It represents the time during which the let-down hormone released at milking time is active in the udder. Our measurements showed that this time varied from as little as two minutes for some cows to as much as 30 minutes for others.

The method of measurement requires the use of the milk flow recording units built at Ruakura for the No. 1 Dairy and precise timing of the period between let-down and milking under controlled conditions.

### Results of Let-down Tests

A relation between the duration of let-down action and response to the stimulus is seen in Table 4. The large differences in production between twins occurred most often in the cows with very short let-down.

**TABLE 4—DIFFERENCE IN TOTAL FAT AS PERCENTAGE OF NORMALLY STIMULATED TWIN AND LET-DOWN DURATION**

| Twin numbers | Difference | Let-down duration |
|---|---|---|
| | per cent | minutes |
| 701-2 | 66.0 | 3-4 |
| 601-2 | 82.3 | 2 |
| 661-2 | 65.6 | 2 |
| 667-8 | 68.5 | 5-6 |
| 657-8 | 25.2 | 14-15 S.<br>12-14 N.S. |
| 603-4 | 32.6 | 6-7 S.<br>8-9 N.S. |
| 663-4 | 14.1 | 10-11 S.<br>13-14 N.S. |
| 673-4 | —0.8 | 6-7 S<br>6-7 N.S. |
| 669-70 | —4.4 | 8-9 S.<br>8-9 N.S. |
| 817-8 | —11.1 | 5-6 S.<br>7-8 N.S. |
| 743-4 | —3.8 | 29-30 S.<br>22-25 N.S. |
| 627-8 | —5.6 | 6-7 S.<br>7-8 N.S. |

These figures suggest very strongly that the cows with a highly active let-down response are little affected by lack of stimulus, while those with a relatively poor let-down response are markedly reduced in production by lack of stimulus.

The cows with the most active let-down proved to be also the highest producers, particularly in the non-stimulated group.

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# Radio Broadcasts for Farmers

RADIO broadcasts for farmers will be given in October as follows:

**1XH Hamilton, 12.33 p.m.**

10 October—"Self-feeding Silage", by P. F. Goulding, Farm Advisory Officer, Department of Agriculture, Hamilton.

17 October—"Aspects of Recent Work at the Soil Research Station, Rukuhia", by I. L. Elliott, Superintendent, Rukuhia Soil Research Station, Hamilton.

31 October—"Cooling of Milk and Cream", by M. J. McFetridge, Supervisor, Farm Dairy Instruction, Department of Agriculture, Hamilton.

**1YZ Rotorua, 7.15 p.m.**

5 October—"Specific Plants for Specific Purposes", by R. W. Moody, Farm Advisory Officer, Department of Agriculture, Rotorua.

19 October—"Work of Rabbit Boards", by M. B. McKenzie, Livestock Instructor, Department of Agriculture, Tauranga.

**2XG Gisborne, 8 p.m.**

4 October—"Transport of Stock to Works", by R. B. Bain, Senior Meat Inspector, Department of Agriculture, Gisborne.

11 October—"For the Orchardist", by J. Overbye, Instructor in Horticulture, Department of Agriculture, Gisborne.

25 October—"Draining Wet Lands", by H. de O. Chamberlain, Farm Advisory Officer, Department of Agriculture, Gisborne.

**2XA Wanganui, 8 p.m.**

6 October—"For the Country Woman", by Mary Macdonald.

13 October—"Farming News".

20 October—"Topdressing in the Waimarino", by A. D. Mercer, Fields Instructor, Department of Agriculture, Wanganui.

27 October—"Swede and Turnip Varieties", by A. K. Booth Farm Advisory Officer, Department of Agriculture, Wanganui.

**2XP New Plymouth, 8 p.m.**

6 October—"News and Views from the Department of Agriculture's Farm Advisory Division", by S. H. Henry, Farm Advisory Officer, Department of Agriculture, Stratford. Y.F.C. session, by David Smith, North Taranaki Y.F.C. district committee.

**2YZ Napier, 7.10 p.m.**

4 October—"Irrigation", by R. G. Burton, Farm Machinery Officer, Department of Agriculture, Hastings.

18 October—"Bees", by L. J. S. Line, Apiary Instructor, Department of Agriculture, Hastings.

**3YA Christchurch, 12.20 p.m.**

3 October—"Itch Mite in Sheep", by A. C. Howse, Veterinarian, Department of Agriculture, Christchurch.

17 October—Review of "The New Zealand Journal of Agriculture", by E. G. Smith, Instructor in Agriculture, Department of Agriculture, Christchurch.

**4YA Dunedin and 4YZ Invercargill, 12.36 p.m.**

3 October—"Winton Experimental Farm", by W. Faithful, Instructor in Agriculture, Department of Agriculture, Invercargill.

5, 12 19, and 26 October—"Marketing N.Z. Meat in the U.K.", by Norman McLumpha, New Zealand Meat Producers Board, London.

10 October—"Lamb Management", by C. A. Martin, Livestock Instructor, Department of Agriculture, Dunedin.

17 October—"Management of Lucerne Stands", by A. A. Duncan, Farm Advisory Officer, Department of Agriculture, Alexandra.

31 October—"N.Z. Grassland Congress", by G. K. McPherson, Fields Superintendent, Department of Agriculture, Dunedin.

**Regular Sessions**

**1YA Auckland,** Mondays at 12.36 p.m. ("Country Journal", including "Report from Ruakura"), Tuesdays, Wednesdays, Thursdays, and Fridays at 7.45 p.m. ("Country Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

**1XN Whangarei,** Mondays at 8 p.m. ("Northland Stock Market Report", followed by "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 12.33 p.m. ("Farm News").

**1XH Hamilton,** Mondays at 12.36 p.m. ("For the Farmer", excluding first Monday in month and public holidays), Wednesdays at 12.33 p.m. ("Report from Ruakura").

**1YZ Rotorua,** Wednesdays at 7 p.m. ("Bay of Plenty Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

**2YZ Napier,** Tuesdays at 7.10 p.m. ("The Hawke's Bay Farmer"), Thursdays at 12.33 p.m. ("News for the Farmer").

**2XG Gisborne,** Tuesdays at 8 p.m. ("Farm Session").

**2XP New Plymouth,** Thursdays at 8 p.m. ("Farm Session").

**2XA Wanganui,** Mondays at 8 p.m. ("For the Man on the Land"), Tuesdays at 8 p.m. ("Farm Supplement"), and Thursdays at 8 p.m. ("Farm Topics").

**2XB Masterton,** Fridays at 6.45 p.m. ("Farm Session").

**2XN Nelson,** Thursdays at 8 p.m. ("Nelson Farm Topics").

**2ZA Palmerston North,** Mondays at 12.36 p.m. ("Country Digest") and Fridays at 8.30 p.m. ("Country Digest", including Feilding stock market report).

**2YA Wellington,** Mondays, Tuesdays, and Fridays at 7.10 p.m. ("Farm Session"), Thursdays at 12.33 p.m. ("News for the Farmer").

**3YA Christchurch,** Mondays at 12.20 p.m. ("Country Session"). Thursdays at 12.33 p.m. ("News for the Farmer"), and 7.10 p.m. ("Home Paddock").

**3XC Timaru,** Wednesdays at 8 p.m. ("Farmers' Weekly News Service") and Saturdays at 10.30 a.m. ("Country Mailbag").

**3YZ Greymouth,** Mondays at 12.36 p.m. Thursdays at 12.33 p.m. ("News for the Farmer").

**4YA Dunedin,** Mondays at 12.36 p.m.; Tuesdays at 12.33 p.m.; Wednesdays and Thursdays at 12.33 p.m.

**4YZ Invercargill,** Mondays at 12.36 p.m., Wednesdays and Thursdays at 12.33 p.m. ("News for the Farmer").

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# Wool Sales

The dates and venues of wool sales up to the end of December are:

**19 and 21 October:** Dunedin.
**25 October:** Invercargill.
**31 October and 2 November:** Christchurch.
**10 November:** Auckland.
**14 November:** Wanganui.
**18 and 21 November:** Napier.
**25 November:** Wellington.
**5 December:** Christchurch.
**10 December:** Invercargill.
**15 December:** Dunedin.
**19 December:** Timaru.

# Thirteenth Weed Control Conference

THE range of subjects covered by the papers presented at the thirteenth Weed Control Conference in Invercargill in July showed that intensive research work is being conducted to determine how the many chemical weedkillers now available can be best used in dealing with weed problems in New Zealand. Some of the papers dealt with the control of specific weeds such as sweet brier, spurrey, nodding thistle, ratstail, and cutty grass. Others described recent experimental work on general weed control in crops of peas, maize, fodder beet, lucerne, and brassicas.

IN his paper on weed problems of South Otago and Southland A. R. Rankin said of pasture weeds: "Once the pasture has passed beyond the initial establishment stage Californian thistle is the major enemy of not only the higher producing pastures, but of much of the second-class country. Before the advent of hormone weedkillers, cultivation when the paddock was under the plough, followed by frequent mowings when it was sown to pasture, was the main technique for controlling Californian thistle."

Dealing with crop weeds Mr Rankin said that the main winter feed crops were swedes, turnips, and chou moellier, which were usually sown in ridges 24 or 26 in. apart. Scuffling between the ridges controlled the weeds until the crop was big enough to smother the weeds. After feeding off the crop the area was frequently sown to a cereal in spring. Californian thistle was often a bad weed in cereal crops, but it could be suppressed at least until after harvest by spraying with hormones.

According to Mr Rankin the weed content of a pasture is the main factor in determining which paddock should be ploughed for witner feed. As the pasture ages, Californian thistle, Scotch thistle, and ragwort become prevalent and there is the potential threat of nodding thistle. When the pasture runs out, browntop, sweet vernal, and Yorkshire fog with moss and flat weeds make ploughing inevitable. The paddock is ploughed, cropped, and sown to grass and remains in grass until weeds necessitate ploughing again.

## Nodding Thistle

Results of experimental work on nodding thistle in Ashburton County were given by E. Delahunty. The trials were conducted over three years and in each year "there has been a heavy strike of thistle seeds in autumn, and effective control of the thistle, with thistle-free plots in the following

---

HEADING PHOTOGRAPH: J. R. Thomson demonstrating a Department of Agriculture spraying trial for the control of cutty grass at the field trip of the Conference.

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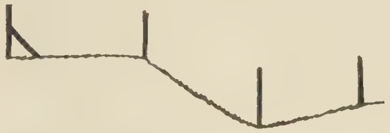

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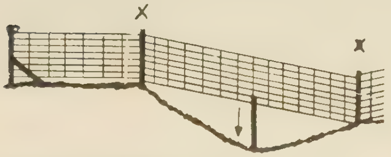

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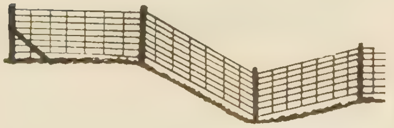

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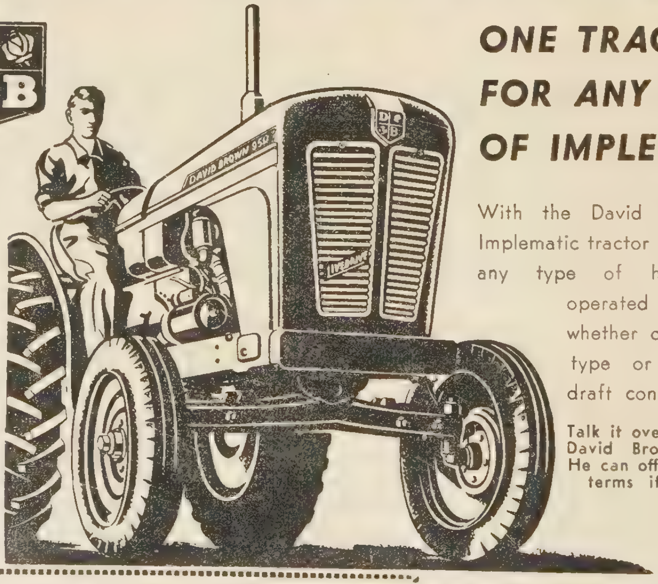

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summer, has been obtained by a spray application in April-May of light rates of several hormone weedkillers. Winter spraying of thistles has been unsuccessful, but September spraying has controlled the thistles on most occasions".

The recommendations were to apply ½ lb of MCPA, MCPB, or the amine salt of 2,4-D to seedling thistles, preferably in April or September. MCPB should be used where there were young clover plants, but this material was less effective during cold weather. If there were thistles in the rosette stage, the rate of application should be increased to nearer to 1 lb per acre. More mature plants could not be controlled with light rates of hormone weedkiller.

## Sweet Brier

The paper on sweet brier presented by A. R. Dingwall, J. G. Richards, and R. C. Schofield was of particular interest to South Islanders. The authors stated that the encroachment of sweet brier "has been much more marked in the South than in the North Island, and especially so in the favoured environments of open tussock grasslands east of the Main Divide. Today it occurs in all South Island counties and is viewed with concern in many inland parts of Marlborough, Canterbury, Otago, and Southland. The Rabbit Destruction Council's successful 'killer' policy removed a significant form of biological control and has been partly responsible indirectly for the brier's conspicuous advancement in recent times, but sweet brier has also gained ground in areas where rabbits have never been a problem".

The authors outlined the effects of various methods which have been used to control sweet brier, both in practice and experimentally — grazing by animals, burning, cutting, grubbing, coverage or basal spraying with hormones, and dust or pellet basal applications of urea chemicals such as fenuron.

Their recommendations were that "landowners faced with the seriousness of this problem would be well advised to take immediate action. . . . Where improvable grassland is threatened by invasion oversow and topdress or otherwise improve competitive ground cover and grazing control. Maintain constant vigilance and grub out any brier seedlings immediately they appear. If brier is already invading, with seedling and scattered small plants apparent, preferably grub or alternatively 'spot' spray with 2,4,5-T-diesel oil mixture. Follow up wherever possible by improving ground cover and controlled grazing.

"Where scattered plants have grown beyond the convenient grubbing stage remove by mechanical pulling or by basal treatment with either 2,4,5-T spray or fenuron pellets, whichever is the more convenient.

J. N. Fitzgerald (left), president at the Conference, and L. J. Matthews, secretary.

"When infestations are already firmly established on a relatively large scale and individual plants are readily accessible to treatment, spray basally with the 2,4,5-T-diesel oil mixture. Under similar circumstances, but where plants tend to form individual thickets rather than distinct and separate crowns, use fenuron pellets in preference to basal spraying. Surface trash that interferes with basal treatments should be removed by grazing or burning before chemical control is attempted.

"Where infestations are strongly established and difficult to penetrate either burn off or open up the area with a light spray of 2,4,5-T applied aerially in summer. Follow up with winter basal spray or spring pellet dressing according to the general nature of the brier plants concerned. In waste places that are accessible or when dealing with exceptionally large plants or thickets bulldozing or mechanical rooting and subsequent chemical treatment of any reviving plants would be appropriate.

"For rugged, inaccessible areas where aerial application is the only feasible method of attack fenuron pellets could be used. Seed dispersal from these difficult areas could be prevented by a midsummer application of 2,4,5-T in fuel oil, applied aerially, every second or third year."

## Crop Weeds

The results of experimental work on weeds in peas and maize were given by T. M. Patterson. In pea trials MCA at 15 lb per acre gave control of weeds except fathen and grasses. A mixture of MCA at 10 lb and MCPB at ¾ lb per acre did not damage the peas and gave better weed control than either MCA alone at 15 lb, or MCPB at 1 lb.

In the maize trials simazine gave excellent weed control. In one trial simazine plots gave a yield of 141 bushels of dry shelled maize per acre, compared with 64 bushels on the unsprayed plots. The weed control obtained with 2,4-D, though good, was inferior to that obtained with simazine, and the yield was 133 bushels. The higher yield obtained with simazine than with 2,4-D was not sufficient to warrant the additional cost of the simazine. Further trials will be conducted with lower rates of some of the newer chemicals related to simazine, which should be more toxic to the grass weeds which resist 2,4-D.

In a paper on the control of weeds in brassica crops M. S. Foreman discussed the differences between the methods used in the North and South Islands. Post-emergent applications of MCA gave good control of willow weed (*Polygonum persicaria*) and Prince of Wales feathers or redroot (*Amaranthus retroflexus*), which were the main weeds in the North. However, in the South Island, MCA was unsatisfactory where spurrey (known as yarr in the South) and fathen were troublesome.

Of the pre-emergent treatments CIPC was the most promising, and it "can play a valuable part in the control of spurrey and many other weeds in the South Island; where band spraying is possible the control of fathen does seem within reach". However, CIPC was not recommended in the North Island, where owing to the higher soil temperatures it caused too much crop damage.

## Ratstail

The paper prepared by D. A. Newman described recent work on control of ratstail with dalapon. Trials at Paeroa, Pukekohe, and Dargaville showed that very good kills of ratstail were obtained with low rates of dalapon without causing too much damage to the better pastures species such as ryegrass and clovers. It was stressed that it was important to follow up by promoting a quick ground cover of good pasture and forming a tight

## Papers and Speakers

"Weeds of South Otago and Southland", **A. R. Rankin**, Fields Instructor, Department of Agriculture, Invercargill.

"Control of Sweet Brier", **A. R. Dingwall**, Fields Superintendent, Department of Agriculture, Christchurch, **J. G. Richards**, Farm Advisory Officer, Department of Agriculture, Oamaru, and **R. C. Schofield**, Department of Agriculture, Timaru.

"Control of Spurrey", **R. L. Taylor**, Research Chemist, Farm Chemicals Company, Port Mapua.

"Brassica Weed Control in South Otago", **R. C. Stephen**, Farm Advisory Officer, Department of Agriculture, Balclutha.

"Chemicals and Application Techniques for Weed Control in Brassicas", **M. S. Foreman**, Chief Technical Officer, J. H. Barbour and Son Ltd., Christchurch.

"Adjuvants as an Aid in Increasing the Efficiency of Weedkillers", **W. M. Houlker**, Technical Advisory Officer, Agricultural Division, Shell Co. of New Zealand Ltd., Wellington.

"Aquatic Weed Control", **L. J. Matthews**, Principal Scientific Officer (Weeds), Department of Agriculture, Wellington.

"New Aspects of Vegetation Control", **G. J. Wills**, Technical Representative, Ivon Watkins Ltd., Dunedin.

"Total Weed Control", **R. K. Ward**, Scientific Officer, Department of Agriculture's Rukuhia Soil Research Station, Hamilton.

"The Tolerance of Plants to New Chemicals", **F. B. Thompson**, Principal Scientific Officer, Department of Agriculture's Rukuhia Soil Research Station, Hamilton.

"Weed Control in Peas and Maize", **T. M. Patterson**, Technician, Department of Agriculture's Rukuhia Soil Research Station, Hamilton.

"Application of 2,4-DB to Mature Lucerne", **F. A. H. Meeklah**, Technician, Department of Agriculture's Invermay Research Station, Mosgiel.

"Weed Control in Lucerne", **T. G. Sewell**, Farm Advisory Officer, Department of Agriculture, Gore.

"Residual Effects of Chemicals", **A. Thompson**, Technician, Department of Agriculture's Rukuhia Soil Research Station, Hamilton.

"Crop Production in Chemically Killed Turf", **S. N. Dawes**, Scientific Officer, Department of Agriculture, Wellington.

"Thistle Identification", **A. J. Healy**, Assistant Director, Botany Division, Department of Scientific and Industrial Research, Christchurch.

"Control of Nodding Thistle", **E. Delahunty**, Farm Advisory Officer, Department of Agriculture, Ashburton.

"Eradication and Replacement of Ratstail", **D. A. Newman**, Farm Advisory Officer, Department of Agriculture, Dargaville.

"Control of Cutty Grass (*Carex* spp.)", **F. C. Allen**, Technical Officer, Canterbury (N.Z.) Seed Co. Ltd., Christchurch.

Printed proceedings of the Conference, containing all the papers and discussions, may be obtained for 15s. a copy from the Secretary, Weed Control Conference, Department of Agriculture, P.O. Box 2298, Wellington.

sward to discourage the influx of ratstail seedlings. The recommendations were:

1. Topdress adequately.
2. Spray with 2½ to 3 lb of dalapon per acre in 15 to 20 gallons of water.
3. Topdress and oversow or undersow the area within a fortnight of spraying. Drilling seed is preferable to oversowing where practicable.
4. Graze the resulting new pasture in a manner which encourages quick establishment of cover.

### Conference Prizes

Each year prizes are awarded for the best papers at the Conference. Points are given for the value of a paper, audience interest, discussion, and punctuality and timing in the submission of a paper. The winning paper this year was that by E. Delahunty on "Control of Nodding Thistle". A. R. Dingwall and co-authors gained second place with their contribution on "Control of Sweet Brier", and T. M. Patterson's paper on "Weed Control in Peas and Maize" was third.

In recent years the quality of the papers has risen considerably and has now reached a high level in both technical value and presentation. Many speakers use two projectors and are thus able to show illustrations of the effects of two treatments simultaneously, which makes it easier for the audience to compare the results.

### Field Trip

The type of farming in the district was explained to the visitors during a field trip one afternoon which included an inspection of local weed trials and the Winton Experimental Area. Visitors met Mr J. Grant of Bayswater, who for 13 years held the world's record with a yield of 112 bushels of wheat per acre.

### Next Conference

It was decided at the annual general meeting to hold the next conference at New Plymouth in July 1961. It was also announced that the executive had decided to award a prize in alternate years to the student from Massey or Canterbury Agricultural College who presented the best thesis on a subject relating to weed control.

The officers elected for the ensuing year were: President, F. C. Allen, Christchurch; past-president, J. N. Fitzgerald, Wellington; vice-president, F. B. Thompson, Hamilton; secretary, L. J. Matthews, Wellington; treasurer, M. E. Williams, Wellington; committee, A. C. Burgess, Palmerston North, P. S. Ferens, New Plymouth, M. S. Foreman, Christchurch, P. B. Lynch, Wellington, G. R. Moss, New Plymouth, and R. L. Taylor, Nelson.

—*F.B.T.*

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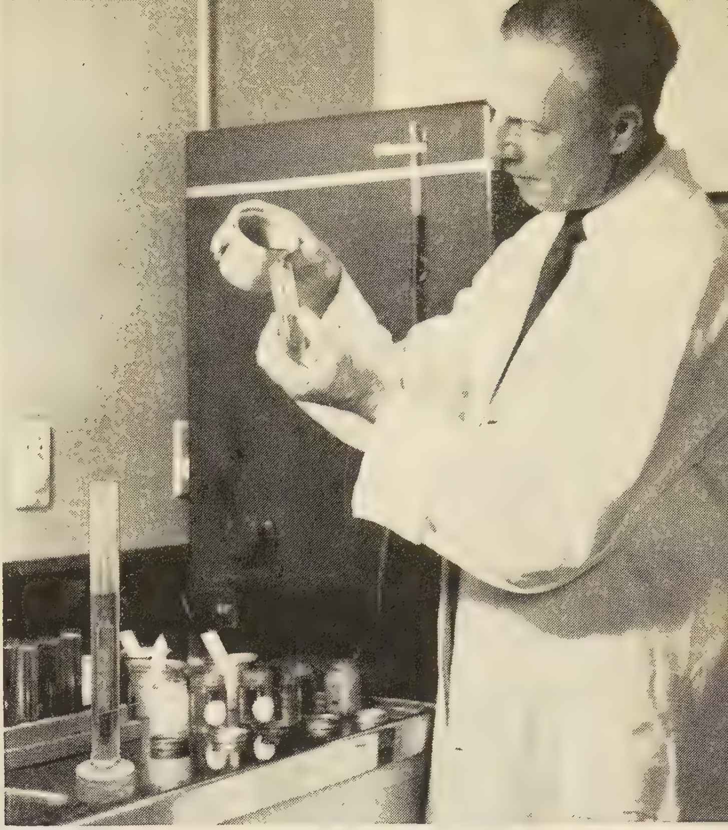
# Anti-granulation Method for Honey Packers

By R. S. WALSH,
Honey Grader,
Department of Agriculture,
Auckland



[Sparrow

Experiments have shown that the moisture content within the range of typical honeys and most suitable for all types of bottling honey is 19 or 20 per cent water. Use of a Chataway honey hydrometer (shown in the bottom left corner of this illustration) is recommended to determine the specific gravity of honey.

A METHOD that might be applied to restrict granulation of honey at any stage of its development and thus enable packers to prepare their product to meet market demands exactly is described in this article. The method was evolved from observations during the processing of honey to ensure its remaining liquid and crystal free for a year or longer. It can be expected to overcome most of the major difficulties with which packers are familiar.

LIQUID honey is much less prone to fermentation than granulated honey and pasteurisation ensures that it remains free considerably beyond the normal period of immunity. The generally accepted practice of preventing granulation by heating honey to various temperatures has proved moderately successful if all crystals are melted out, but they begin to form again too soon.

The laevulose-dextrose ratio and the water content are two factors in honey that are not quite stable and both influence the granulation of honey. The greater the ratio of laevulose sugar to dextrose and the higher the water content of honey the less tendency there is toward granulation. There is an optimum figure suitable to each type of honey at which either or both factors can be adjusted to ensure a long crystal-free period. Though laevulose, dextrose, and water are natural ingredients of honey, the adjustment of the water content is obviously the simplest and most practical way to deal with the problem.

It has been found by experiment that a moisture content within the range of typical honeys and most suitable for all types of bottling honey is 19 or 20 per cent.

## Destroy Yeasts and Crystals

The process, then, involves heating the honey sufficiently to destroy all crystals and sugar-tolerant yeasts, the determination of the moisture content, and the addition of the necessary amount of sterilised water to lower the specific gravity of the honey to the desired figure.

With many different types of honey from widely scattered localities it is always a problem to gauge the amount of heat necessary to melt out the crystals. This can vary considerably in both intensity and length of application, but fine-grained honey generally requires less heat than coarse, and honeys of low specific gravity less than those with a lower percentage of moisture. Prolonged heating at excessive temperatures tends to darken honeys, particularly those in the lower colour range. Granulated honey in commercial quantities cannot quickly be rendered liquid whatever the amount of heat used; and as it is the length of time honey is held at high temperatures rather than the temperature itself that causes its quality to deteriorate, heat applied in the initial melting of the honey should not exceed 130 degrees F.

To destroy the crystals and pasteurise the honey the temperature should then be raised to 170 degrees F for 15 minutes; if crystals are very coarse, the temperature may have to be raised to 180 degrees F for 10 minutes. The honey should be kept moving during this treatment and then the temperature should be lowered as rapidly as possible. In liquid packs even these temperatures would not retard crystal development for long in some coarse types of honey without moisture adjustment.

## Moisture Adjustment

Specific gravity readings should now be taken with either a refractometer or Chataway honey hydrometer and after the moisture content has been checked against the weight per gallon of the honey by reference to the chart on page 231, a quick calculation should enable the packer to gauge the quantity of boiled or distilled water to be added to the honey to adjust the specific gravity to 20 per cent.

The body of liquid honey with a specific gravity adjusted to 20 per cent

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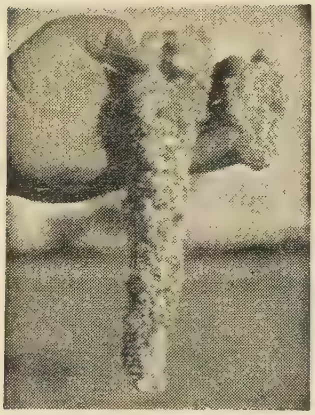

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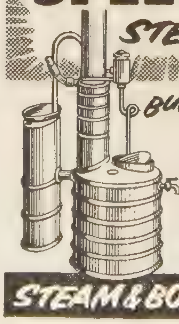

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is excellent and will give complete satisfaction to the customer, as it pours readily and has not the stickiness associated with more viscous honeys.

**The important point to remember with this type of pack is that pasteurisation must be thorough or fermentation will soon develop.**

Jars should not be filled unwashed, as dust particles can initiate crystal formation, and they should be sealed as soon as possible after filling; otherwise inoculation by crystalline material in the atmosphere may occur.

The ideal storage temperature for this type of pack pending dispatch to retailers is 32 degrees F or less, but even at normal room temperatures the honey should remain crystal free for a year or more.

## Effect of Food Trends on Granulated Honey

What can be done with the components of liquid honey to bring about a particular result must obviously apply, at least in part, to granulated honey. It is natural for honey to granulate more or less firmly, in accordance with its water content, and until fairly recently this was all the consumer desired provided the honey was smooth grained and mild flavoured. The producer on the other hand was content to advertise honey as a pure food and to refer to its firm granulation as evidence of its purity. However, the refining of foodstuffs is so stressed today that packers of honey have been compelled to follow the current trend. Consequently there has been much experimentation to find means of providing the consumer with a smoother and more spreadable article.

Some of the methods used include crushing the sugars mechanically, excessive stirring and pumping, and a succession of heat treatments. Some packers with a sound knowledge of the chemistry of honey have been successful, but many others have supplied the market with poorly packed honey heavily impregnated with air and with its natural keeping qualities much impaired.

## Granulation Influenced by Specific Gravity

Granulation may be complete at any point between the extremes of hardness and softness. Honeys with a low water content crystallise very firmly and are prone to the unsightly "frosting" that so mars the appearance of granulated honey in glass containers. Conversely soft granulating honeys are nearly always high in water content and do not "frost". Those rare types that do not granulate result from an unbalance of sugars. The density of such honeys is a clear indication of the cause and the remedy is to blend with a honey high in dextrose sugar. The question is: How are producers to satisfy the market requirements other than by recourse to the various methods now used in attempting to release the water held in suspension in the honey?

**MOISTURE AND WEIGHT CHART**

| Moisture per cent | oz of water per gal of honey to increase moisture to 17.2 per cent | oz of water per gal of honey to increase moisture to 20 per cent | Weight of honey per Imp. gal at 68 deg F lb oz |
|---|---|---|---|
| 13.2 | 11 | 19 | 14 8 |
| 13.6 | 9½ | 18 | 14 7½ |
| 14.0 | 8½ | 16½ | 14 7 |
| 14.4 | 7½ | 15½ | 14 6½ |
| 14.8 | 6½ | 14½ | 14 6 |
| 15.2 | 5½ | 13½ | 14 5¾ |
| 15.6 | 4½ | 12 | 14 5¼ |
| 16.0 | 3 | 11 | 14 4¾ |
| 16.4 | 2 | 10 | 14 4¼ |
| 16.8 | 1 | 9 | 14 3¾ |
| 17.2 | 0 | 7½ | 14 3½ |
| 17.6 | — | 6½ | 14 3 |
| 18.0 | — | 5½ | 14 2½ |
| 18.4 |  | 4½ | 14 2 |
| 18.8 | — | 3½ | 14 1½ |
| 19.2 | — | 2 | 14 1 |
| 19.6 | — | 1 | 14 0½ |
| 20.0 | — | 0 | 14 0 |

These tables were calculated from the following formula:

Weight of water to be added (in ounces per gallon of initial honey) is W where:

$$W = \frac{160\,(D_1 - D_2)}{D_2 - D}$$

and where $D_1$ = initial density of honey, $D_2$ = required density of honey, $D$ = density of water (all densities in the same units)

If all honey contained sufficient water to maintain a soft granulation, it would not be necessary to attempt to bring this about by some methods used at present. The obvious remedy is to adjust the water content of too firm honeys by the addition of just the right amount of water to ensure the honeys are safe from fermentation yet provide a naturally smooth and plastic spread.

Honeys with coarse crystal formation will require to be liquefied, when the necessary moisture adjustment can be made, and "seeded" with a fine-grained starter.

Sterilisation would be automatic during this process. While 17.2 per cent moisture is a perfectly safe figure at which to fix the specific gravity of sterilised honeys, packers may prefer a slightly higher gravity for honey that does not require reprocessing.

If the specific gravity of the honey is ascertained, the adjustment in water content can be calculated by use of the formula and chart above.

## Use of Moisture and Weight Chart

Reference to the chart will show in ounces the amount of water required to adjust a gallon of honey of any specific gravity to a moisture content of 17.2 per cent. Dividing the weight per gallon of the original honey into 2,240 lb will give the number of gallons per ton and this, multiplied by the number of ounces of water per gallon required to raise the specific gravity to 17.2 per cent, gives the total amount of water to be added to the honey. The chart also enables the producer, by use of finely balanced scales and approved standard gallon measures to find the total amount of water required by weight only. However, because of the risk of error through carelessness or faulty equipment the use of a refractometer or hydrometer is strongly recommended. These instruments ensure cleaner working and save considerable time. Information about a honey hydrometer that is absolutely accurate, costs considerably less (about £12) than a refractometer, and would be invaluable to producers and packers for this and other purposes will be supplied by the writer on request.

Little difficulty will be experienced in incorporating water with honey that has been softened just sufficiently to stir. In fact water mixes slightly more readily with honey in this condition than it does in liquid honey.

◆

# Harrowing's Limited Role in Pasture Management

ON well subdivided, high producing dairy farms harrowing is not necessary for most of the year. Provided droppings are fairly soft they will break up and quickly disappear with normal weathering. Harrowing of each paddock after the milking herd has grazed it spreads very little dung and results only in bruising of the grass and retarding of growth for a day or two. Over 15 to 20 paddocks this adds up to a serious loss in grazing time.

After heavy wintering of dry stock on a particular paddock harrowing will probably be necessary to spread large concentrations of dung and level off the ground surface if pugging has been bad. For wintering, some farmers fence their cows into very small daily breaks, feeding out hay and silage on the strip each day. This builds up fertility, and if 4 to 6 lb per acre of perennial or short-rotation ryegrass is oversown, then harrowed and rolled in, worthwhile results are often obtained.

Using heavy tearing harrows in autumn to promote pasture growth is useless and only opens up the turf, resulting in an invasion of weeds. Topdressing and correct grazing management are the soundest way to improve these mediocre swards.

*—D. L. JANETT,*
*Farm Advisory Officer,*
*Department of Agriculture,*
*Pukekohe*

◆

## A FEW QUESTIONS AND ANSWERS

# THE *SENTRY* SPOT-O-MATIC BOOM

*What is the purpose of the Spot-O-Matic?*

To give a means of spot spraying weeds automatically from a tractor.

*What are the advantages?*

Saving of labour time and material making the chemical control of some weeds practical for the first time.

*What weeds could be successfully sprayed by the Spot-O-Matic?*

All weeds in pasture but particularly rushes, gorse, thistles, dock and similar weeds growing above the height of the pasture.

*What chemicals can be applied through the Spot-O-Matic?*

Any weedkiller whether selective or not because the Spot-O-Matic only sprays where there are weeds and could therefore be described as providing selectivity by mechanical means rather than selectivity by chemical means.

*Will the Spot-O-Matic fit any tractor?*

Yes, although it is advisable but not essential to use the special boom mounting available. A satisfactory method of mounting is to fit the boom to a front end loader or similar mounted hydraulic equipment.

*Is the boom mounting able to be fitted to any make of tractor?*

Yes, although it is necessary to state the make of tractor when ordering.

*How fast should the tractor be driven when spraying with the Spot-O-Matic?*

3 m.p.h. or 4 m.p.h.

*What size nozzle should be fitted to the boom?*

This depends on the weed to be sprayed. Broadly speaking, a large nozzle (such as a .67 Fan) with higher pressures (60-80) lbs. per square inch or more) for bushy weeds such as gorse or rushes with a smaller nozzle (such as .46 Fan) and lower pressures (40 lbs. p.s.i.) for thistles, docks, etc. The larger size nozzles will be fitted as standard equipment.

*What sort of pump will be needed to supply the boom?*

A gear pump would not be adequate to supply the output needed. A Hypro Nylon Roller pump is recommended.

*Are the pressures necessary to operate the feeler springs adjustable?*

Yes. The reason is that they can be set to cope with the strength of the various types of weeds and at the same time give instantaneous action to ensure spraying on the correct spot at the correct time.

*Can the Spot -O-Matic be used as an ordinary boom, spraying continually?*

Yes. By adjusting the pressure on the feeler springs to the lowest point the valves will open allowing the nozzle to spray continuously.

*Does the use of the Spot-O-Matic mean that desirable grasses and clovers are protected during spraying?*

Yes. Because the boom only sprays the weeds, the desirable growth is not touched and therefore rates of application that would normally be most injurious can be used without worry.

*Is the Spot-O-Matic a new device?*

It is new to the public but has been the subject of exhaustive testing and trial for 18 months.

*Can the boom be purchased with more than the standard 6 nozzles?*

Yes. Booms with more nozzles and consequently more length can be bought, but they are not recommended except for experienced operators such as contractors, etc.

*Are spare parts readily available?*

Yes. As the boom is entirely New Zealand made spares will be very readily available.

*Can the feeler springs be damaged by obstructions such as stumps, etc?*

The feeler springs are of spring steel and will stand a lot of punishment but it is advisable to turn them up out of the way of major obstructions. This can be done by means of an actuating device on the special boom mounting.

*What is the price of the Spot-O-Matic?*

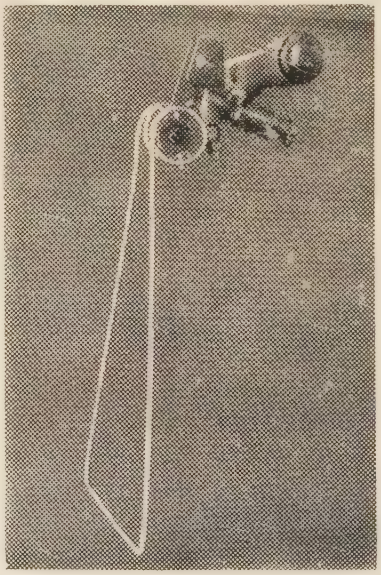
The boom will be £44/15/0 and the boom mounting as an optional extra is £15.

*Where can the boom be bought?*

Any Stock and Station Agent, Dairy Company, Tractor Dealer or Farm Equipment Supplier.

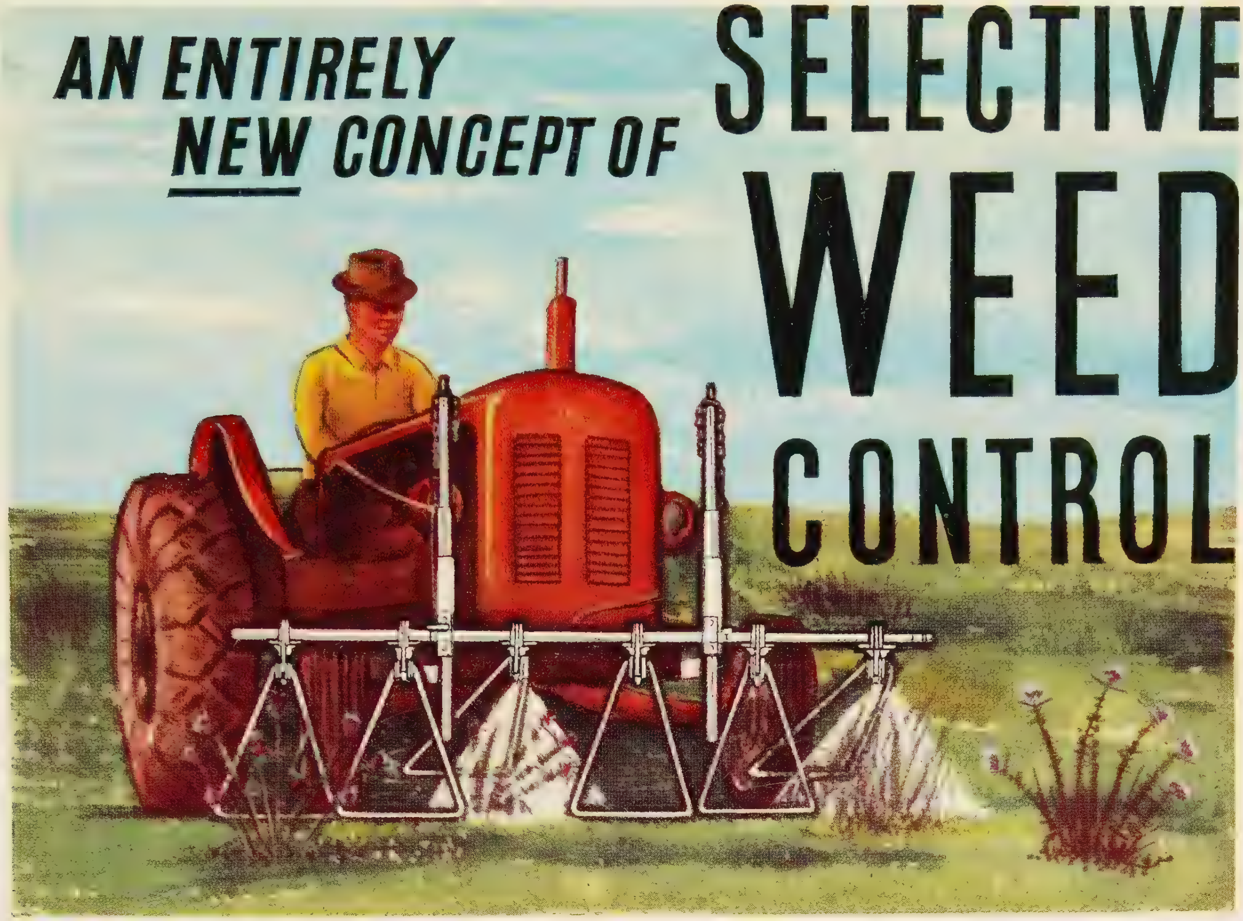
*Where can further information be obtained?*

By writing to the Manufacturer, Frank M. Winstone (Merchants) Ltd.



One of the six spraying heads, which go to make up the complete boom.

The pressures necessary to operate the feeler springs are adjustable so as to cope with the various types of weeds and thereby give instantaneous action to ensure spraying on the correct spot at the correct time and to give greater selectivity.



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# Demonstration Farm Shows Upward Trend in Production Possible on Banks Peninsula

DEMONSTRATION FARM

SINCE 1950 the Department of Agriculture has supervised development of a number of "demonstration" farms in districts where production was showing little improvement. The properties chosen are in general representative of others in the areas and each occupier continues the day-to-day running of his farm except that this conforms to a development programme worked out by the Department in consultation with the farmer. Development costs and returns are recorded and analysed by the Department's economics section. What has been achieved by a development programme on a Banks Peninsula farm is described in this article by P. R. Barrer, Farm Advisory Officer, and R. C. Stuart, Farm Advisory Officer (Economics), both of the Department of Agriculture, Christchurch.

IN an article, "Farming and Topdressing Trials on Banks Peninsula", by P. R. Barrer and D. L. Johns in the September 1954 "Journal", attention was drawn to the declining fertility of the soils of Banks Peninsula and to the need for larger-scale use of aerial topdressing with phosphates associated with changes in management involving oversowing and subdivision. Before this article was published and about the time when the Department began promoting the use of demonstration farms, the Banks Peninsula branch of Federated Farmers had shown interest in the possibilities of aerial topdressing. Consequently a farm at Paua Bay of suitable size and representative of a large area of soils on the peninsula was selected to demonstrate the economic results of aerial topdressing and subdivision.

## Farming Decline

Table 1 gives an indication of the deterioration in farming on Banks Peninsula (Mt Herbert, Wairewa, and Akaroa Counties, a total area of 221,372 acres).

TABLE 1—STOCK NUMBERS ON BANKS PENINSULA

|  |  | Average of years |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
|  | 1925-29 | 1930-34 | 1935-39 | 1940-44 | 1945-49 | 1950-52 | 1957 |
| Cows in milk .. .. | 11,077 | 9,420 | 9,132 | 7,431 | 6,821 | 6,957 | 6,095 |
| Total cattle .. .. | 33,839 | 32,458 | 27,946 | 28,797 | 30,207 | 29,902 | 28,536 |
| Breeding ewes .. | 192,558 | 203,263 | 206,520 | 197,820 | 193,224 | 190,336 | 199,716 |
| Total sheep .. .. | 260,745 | 269,083* | 281,781 | 262,370 | 267,824 | 255,262 | 259,716† |

* Plus 10,000 acres of cocksfoot; † no cocksfoot.

From 1920 to 1952 (the 1957 figure not being comparable) there was a reduction in the number of holdings from 691 to 599.

The reduction in stock figures was, of course, associated with a deterioration in pastures. On many farms pastures which had been cocksfoot-white clover-ryegrass dominant deteriorated to the sweet vernal-browntop-danthonia-flat weeds level. However, secondary growth has not developed to the same degree as on North Island hill country, though on some farms manuka and fern and on others gorse have increased markedly.

In some instances farms that had become marginal economic units were added to by the purchase of similar units. The alternative course of improving the existing unit had seldom been considered.

## Topdressing Results

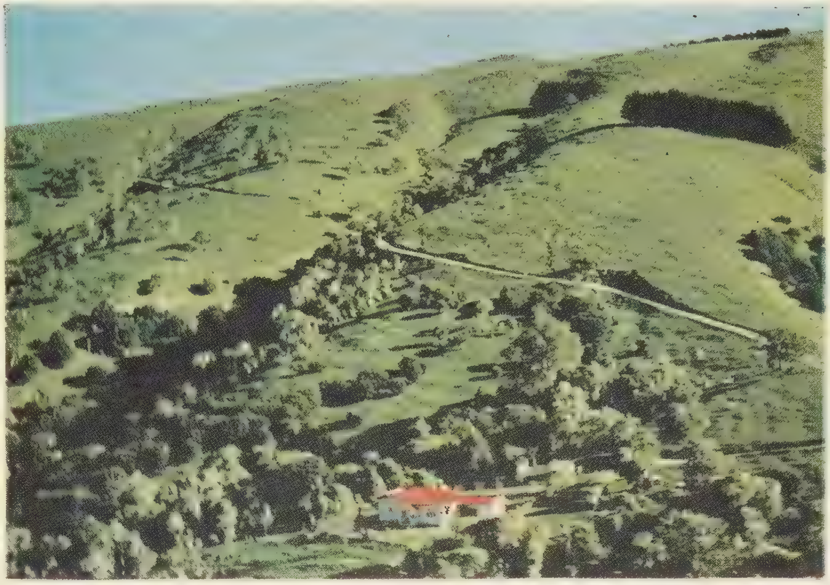
The value of topdressing on Banks Peninsula has been shown in trials since the 1920s. In 1930 A. W. Hudson (then Crop Experimentalist, Department of Agriculture) and J. W. Hadfield (then Instructor in Agriculture, Christchurch) set out in a "Journal" article recommendations for the use of superphosphate and lime or alternatively basic slag. The recommendations were confirmed by many subsequent trials. Only recently was the use of molybdenum also found to be of importance on the loess soils.

In spite of obvious responses on pastures from the use of phosphate on Banks Peninsula soils and the early demonstration there of aerial topdressing (in 1949), only 5.8 per cent of the total area farmed was being topdressed by 1957.

In 1953, when the Paua Bay farm was selected for demonstration purposes, the knowledge and the equipment needed to develop much of the hill country were available. It was considered necessary to clear up confused thinking as to the economic feasibility of developing this class of land.

Many of the features of the development of the Paua Bay farm may not apply wholly to other Banks Peninsula farms, but all have similar basic problems. The results of this experiment are therefore applicable to a greater or less degree wherever the aim is improvement of hill lands on Banks Peninsula.

BANKS PENINSULA DEMONSTRATION FARM



Topdressed country at the back of the demonstration farm homestead (foreground). The patches of light bush and manuka scrub are typical of those which occur on the Akaroa-Pawson soils.

## Objects of Demonstration Farm

The objects of this demonstration farm are to show the impact of a complete aerial oversowing and topdressing programme, combined with closer subdivision, on ground cover, carrying capacity, and production, and to show that the related costs are economic.

A common but erroneous belief is that the soils of Banks Peninsula are derived from volcanic ash and are fertile. Actually not more than 20 per cent are so derived and these are extremely fertile, but the remainder of the soils are derived from loess, largely of greywacke origin, and are now of moderate or low fertility. The following main soil groups have been separated out for convenient grouping in the South Island soil map by the Soil Bureau.

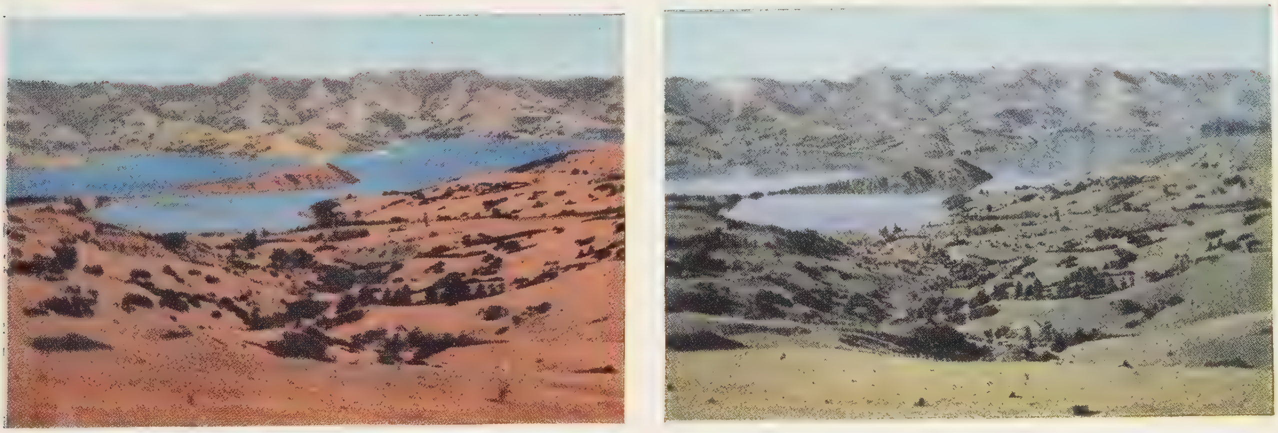
1. **Kiwi-Takahe** soils (44,000 acres or 20 per cent of the total). These are loess soils developed under tussock on hilly and rolling slopes. They occur below 1,000 ft elevation where rainfall is less than 35 in.

2. **Evans-Kiwi** steepland soils (10,100 acres or 5 per cent of total). Evans is a volcanic soil with many rock outcrops developed under tussock. Small areas of Kiwi soils are associated on loess deposits.

3. **Pawson** hill soils (33,700 acres or 15 per cent of the total). These are loess soils developed under scrub or light bush with a medium rainfall (generally above 35 in.) and occur usually below 1,000 ft elevation. A subsoil "pan" results in impeded drainage, particularly on easy slopes.

4. **Akaroa-Pawson** hill soils (30,100 acres or 14 per cent of total). Akaroa soils on moderately steep to steep loess slopes are developed under light bush commonly above 1,000 ft elevation. Pawson soils are associated on easier slopes.

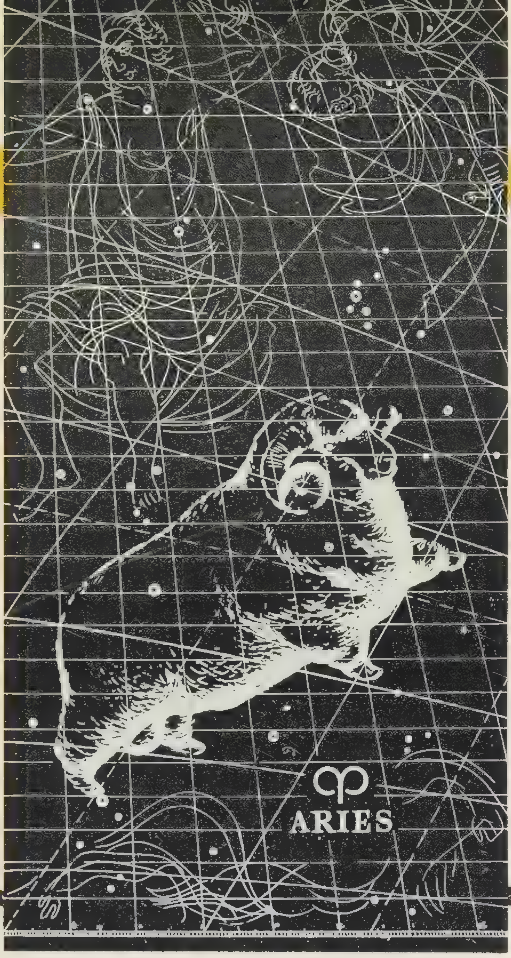
5. **Bossu-Summit** hill soils (33,400 acres or 15 per cent of total). Of these loess soils Bossu is developed under tussock at above 1,000 ft (generally easy rolling to moderately steep ridge tops) and a medium rainfall of more



JANUARY 1956

APRIL 1959

Effects of drought on Banks Peninsula: Left—In a severe drought year. Right—Same area after recovery.



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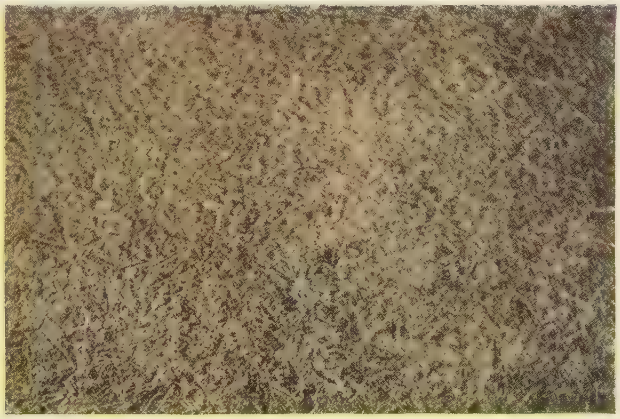
Cover of flat weeds, danthonia, sweet vernal, and crested dogstail on an unmanured plot.



Plot which received 1 ton of lime and 3 cwt of superphosphate per acre a year for three years.

than 30 in. Summit soils are developed under forest at a high altitude and with high rainfall.

6. **Stewart-Summit** steepland soils (50,000 acres or 23 per cent of total). Stewart is a volcanic soil at high altitude developed under forest and under high rainfall. Summit soils are associated on easier slopes.

7. **Stewart-Akaroa** steepland soils (9,600 acres or 5 per cent of total). A limited amount of Stewart is associated with the upper levels of Akaroa soils.

8. **Barry** soils (6,600 acres or 3 per cent of total). These alluvial soils on the flats are derived from loess and volcanic soil material washed from the hills.

## DEMONSTRATION FARM

The demonstration farm is that of Mr W. A. Newton, Paua Bay. It had an area of 566 acres when the demonstration work began in 1954, but this was reduced to 477 acres in 1958. The soil type is Akaroa-Pawson silt loam, all moderately steep to steep, rising from sea level to 1,300 ft, and typical of 30 per cent of the peninsula. There is no ploughable land on the property.

In 1953 the pasture cover on the dry faces consisted of danthonia, sweet vernal, suckling clover, crested dogstail, and flat weeds; and on the damper faces of Yorkshire fog, white clover, crested dogstail, browntop, ryegrass, flat weeds, moss, cocksfoot, and sweet vernal. Most of the land is clear, but there are some patches of manuka scrub and a few patches of light bush in the gullies. Some gorse present in earlier days has been cleared and there is now only an odd patch requiring annual treatment.

The farm is typical of sheep farms on Banks Peninsula both in size (a one-man unit) and soil type, as Akaroa-Pawson type occurs most widely. Rainfall is generally about 35 to 40 in., but varies considerably as shown by the following figures.

| | in. |
|---|---|
| 1955-56 (July to June) .. .. | 35 |
| 1956-57 (July to June) .. .. | 65 |
| 1957-58 (July to June) .. .. | 48 |
| 1958-59 (July to December) .. | 6 |

In 1954 paddocks were of 113, 110, 100, 90, 60, 60, 18, 12, and 4 acres. The 90-acre paddock was sold in 1958. In 1953, when the first particulars were ascertained, the property carried 1,000 Romney crossbred sheep (770 ewes and 230 hoggets) and 49 mixed age cattle. At that stage Mr Newton doubted whether the farm would long remain economic unless improvements were made.

### Development Programme

The following programme of development was agreed to in 1954:

#### (a) Airstrip and Shed

As no land on the property was available, an airstrip and fertiliser shed were to be built on a neighbouring property on a cooperative basis between Mr Newton and two adjoining farmers.

#### (b) Subdivisions and Water Supply

Some of the land is dry slopes facing north-west and some shady southerly slopes. The aim of further subdivision, apart from reducing paddock size, was to shut off the dry from the shady faces. Accordingly, the 110-acre, 100-acre, and one of the 60-acre paddocks were each to be subdivided into two paddocks. The 113-acre paddock of leased land was eventually purchased in 1957 and this is now being subdivided into three paddocks. Water from a spring had to be piped to one of the subdivided paddocks.

#### (c) Topdressing and Oversowing

The original topdressing programme envisaged the use of some 25 to 30 tons of basic slag per annum for the first three years, 20 tons for the next two years at the initial rate of 3 cwt per acre per annum, and then two further dressings of 2 cwt per acre per annum. When the whole farm had received 7 cwt of basic slag per acre, a quarter of it would be treated each year with 2 to 3 cwt per acre, involving an annual dressing of 12 to 18 tons.

Because of results of later trials on the farm in which responses were obtained to molybdenum the topdressing programme was modified to include the application of molybenised superphosphate followed by ordinary superphosphate.

By June 1959, 190 acres had received 7 cwt of basic slag and 2 cwt of molybdenised superphosphate per acre; 70 acres, 7 cwt of basic slag per acre; 70 acres, 4 cwt of basic slag and 2 cwt of superphosphate per acre, and 40 acres, 4 cwt of basic slag and 2 cwt of molybdenised superphosphate per acre. In addition 130 acres has been treated with DDT wet-mix superphosphate. No topdressing has been done on 113 acres. The whole topdressing programme will be completed by 1962.

Dry faces were to be sown with 2 to 3 lb of subterranean clover per acre (half Tallarook, half Mt Barker). Some 90 acres has been oversown with subterranean clover and 170 acres with certified white clover at 1 lb per acre. Ten acres on a cold face was sown with Montgomery red clover in late winter and this proved very successful.

Over a five-year period as a result of the topdressing and oversowing programme there has been a marked improvement in pastures. A measure of the degree of improvement is given by a comparison of ground cover at the beginning and end of the period.

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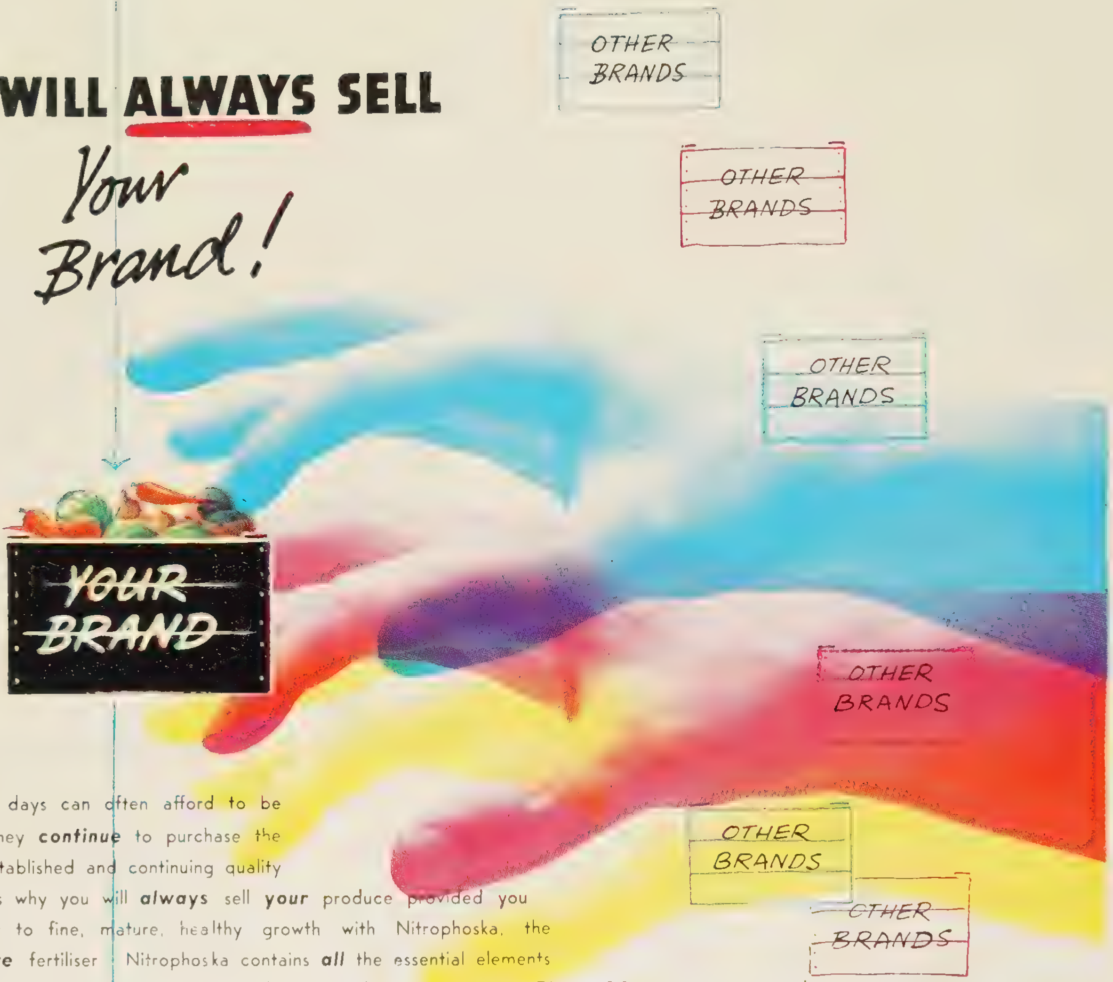
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Left—No manure. Right—3 cwt of basic slag per acre a year for three years.

At the beginning clovers occupied only 10 per cent of the total ground surface; grasses (mostly inferior types such as browntop and danthonia) 75 per cent; and weeds and bare ground 15 per cent. At the end of the period clovers increased to 30 per cent and grasses (ryegrass a dominant species, some cocksfoot, and inferior grasses much less evident) to 62 per cent; weeds and bare ground were down to 8 per cent.

Improvement in pastures is reflected not only in better composition, but in quick recovery after even small amounts of rain, in prolongation of growth into late autumn and winter, and in earlier spring growth. The combination of these effects has allowed earlier lambing and earlier and more successful fattening of lambs.

## Modifications to Original Programme

**(a) Molybdenum**

The changeover to molybenised superphosphate from basic slag has been mentioned. However, the results achieved so far are largely due to the basic slag topdressing.

**(b) Grass Grub and Subterranean Caterpillar**

Grass grub and subterranean caterpillar attack has been very pronounced on Banks Peninsula in recent years. It is difficult to gauge just how satisfactory is the spread of DDT obtained from the air on this class of hill country, but the 130 acres treated has suffered only very little damage since being treated whereas other paddocks have been severely affected.

**(c) Weed Control**

Two severe droughts (1955-56 and 1958-59) have been experienced during the development programme. The opening up of pastures on the drier faces which followed these dry spells has allowed extensive areas of variegated, winged, and scotch thistles to develop. These thistles have been controlled both by aerial and ground spraying with 2,4-D and MCPA.

## Economic Features

Though in the base year 1954-55 the farm is shown (Table 2) as running 802 ewes and replacements, the number was normally lower, about 770 ewes and replacements and 45 cattle being wintered.

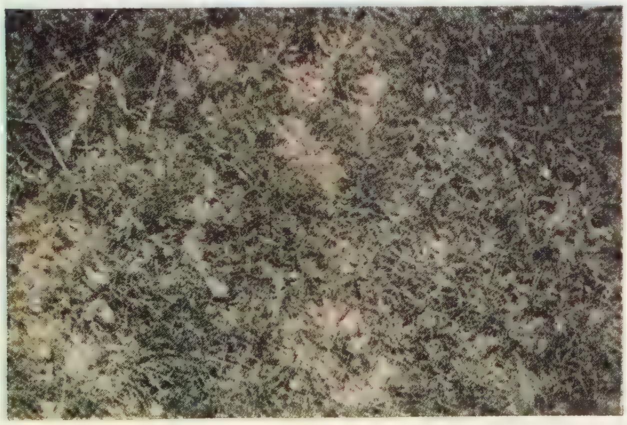
For the purposes of measuring economic factors since 1954-55 a few assumptions have been made which do not actually apply to this property but which could be said to apply to most farms on Banks Peninsula in most years. These assumptions have tended to deflate actual profits; for example, PAYE concessions in 1957-58 have been ignored and wages for one permanent man have been debited over the past two years, when in fact no permanent labour has been employed.

## Three Vital Points

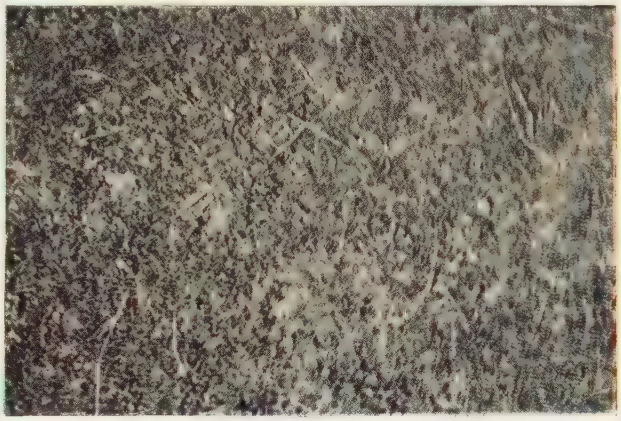
Three vital points to bear in mind regarding this farm when making any assessments since 1954 are:

1 The owner, Mr Newton, confirms that it was only with difficulty that he was maintaining stock numbers, and with obvious continuing pasture deterioration it was his intention to **reduce** stock numbers.

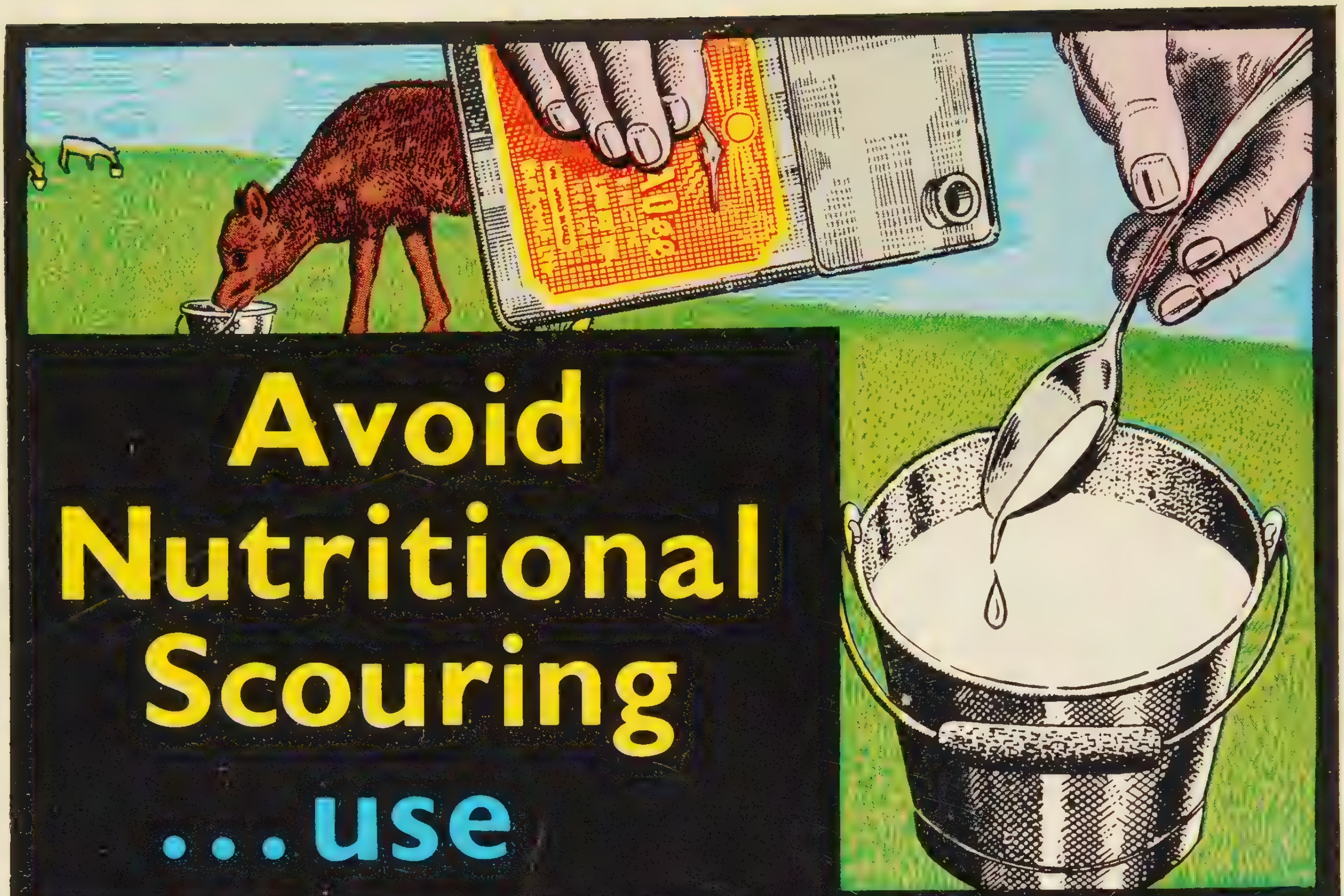
2 The experiment, if one may call it such, will not be completed until 1961-62—a seven-year programme. Only about three-quarters of the farm has been topdressed and not all of that portion has had its full quota of manure; the greatest increases in production are expected from the 113 acres yet to be treated.



No fertiliser or oversowing.



Topdressed with three annual applications of 3 cwt of basic slag per acre and oversown with subterranean clover.



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3 According to the Department's farm management survey of Akaroa County made in 1953-54 (the "Journal", November 1955, p. 485), the average carrying capacity was 1.8 ewe equivalents per acre (and apparently declining) whereas this farm was then carrying 2.1 ewe equivalents.

Thus the base year's figures do not reveal the hidden downward trends in production or the fact that even then the carrying capacity was 0.5 ewe equivalent higher than the district average. The owner's immediate requirements from the programme were simple: **To maintain stock numbers and arrest pasture deterioration.** The impact of the programme described to date on stocking and production has been as follows:

### (a) Stocking and Carrying Capacity

In the past four years the overall carrying capacity has increased from 2.1 ewe equivalents per acre to 3.1. Meanwhile Mr Newton has quit 90 acres of poorer country and will carry more stock more easily on less land. By the completion of the programme there should be little difficulty in carrying 3.6 or more ewe equivalents per acre—1.5 ewe equivalents higher than the base year and very nearly 2 ewe equivalents more than the county average revealed in the 1953-54 survey.

TABLE 2—STOCKING

| | 1954-55 | 1955-56 | 1956-57 | 1957-58 | 1958-59 | 1959-60 |
|---|---|---|---|---|---|---|
| Ewe hoggets .. .. .. .. | 200 | 240 | 240 | 255 | 253 | 250 |
| Breeding ewes .. .. .. .. | 802 | 817 | 810 | 824 | 860 | 880 |
| Other sheep .. .. .. .. | 46 | 34 | 36 | 69 | 79 | 100 |
| Cattle .. .. .. .. | 49 | 43 | 40 | 65 | 78 | 74 |
| Total ewe equivalent .. .. | 1,218 | 1,274 | 1,244 | 1,416 | 1,465 | 1,500 |
| **Ewe equivalent per acre .. ..** | 2.1 | 2.2 | 2.2 | 2.5 | 3.1 | 3.1 |

Total sheep numbers have increased by 182, consisting of 78 ewes, 50 ewe hoggets, and 54 other sheep. At first glance this may not seem impressive, but it should be recalled that the base year's figures overstate the normal stocking before the start of the development programme (770 would be closer to the number of ewes usually wintered). Furthermore cattle numbers have increased considerably.

During the first years of the development programme dry seasons caused a very great variation in growth on the unimproved pastures, which was handled by increasing the proportion of cattle. The use of cattle rather than breeding ewes allows greater flexibility, as their numbers may be varied according to the feed position. The markets available to Mr Newton allowed him to do this profitably, both financially and from the point of view of pasture control.

The increase in carrying capacity of one ewe equivalent in four seasons may seem rather slow to farmers in some districts. The aspect of the rate of development will be discussed later, but the **decline** in pasture productivity had to be arrested before stocking momentum could be gathered.

Condition of the centre of the farm in April 1959. The country, with the exception of an unimproved block on the extreme right, had received 7 to 9 cwt of phosphate since 1954. In the lower right corner is the woolshed and from about the centre toward the left is the farm road. This illustration includes part of the area shown at the top of page 235, but the photograph was taken from a position further to the right.

### (b) Wool Production

Trends in wool production (Table 3) are an excellent indication of progress on Banks Peninsula. The output of wool on this holding, like stocking rates, was high even in the base year at 21.4 lb per acre when compared with the county average. This was 12.5 lb per acre and production for the county ranged from 4.5 lb to 22.5 lb per acre.

Wool production increases were not expected to be spectacular, but at 30.6 lb per acre—an increase of 9.2 lb per acre over 1954-55—the 1958-59 figure is most satisfactory. The total increase over the base year is about 2,500 lb, which valued at 3s. per pound is £375 and at 4s. is £500. It is obvious, too, that wool weights per sheep have increased.

TABLE 3—WOOL PRODUCTION

| | 1954-55 | 1955-56 | 1956-57 | 1957-58 | 1958-59 |
|---|---|---|---|---|---|
| | lb | lb | lb | lb | lb |
| Total .. .. .. | 12,093 | 11,865 | 13,903 | 12,898 | 14,579 |
| Per acre .. .. .. | 21.4 | 21 | 24.6 | 22.8 | 30.6 |

### (c) Lambing Trends and Production

At first glance the figures in Table 4 on page 243 may appear to supply just cause for criticism, but a closer examination will reveal otherwise. The owner sells lambs on the hoof and it has not always been possible to follow lambs through to dressed weights, but from what can be gathered the 612

*increasingly*

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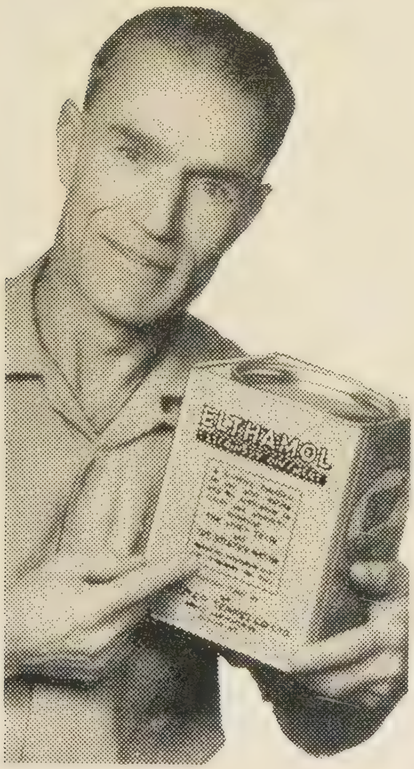

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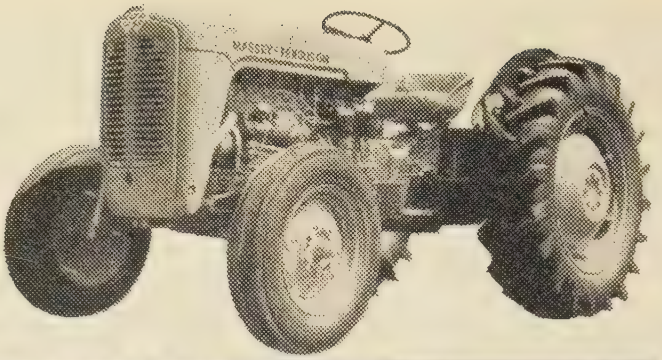

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TABLE 4—LAMBING

| | 1954-55 | 1955-56 | 1956-57 | 1957-58 | 1958-59 |
|---|---|---|---|---|---|
| Tailed .. .. .. | 899 | 883 | 762 | 831 | 1,015 |
| Percentage .. .. | 112 | 108 | 94 | 101 | 118 |
| Sold fat .. .. | 612 | 233 | 310 | 500 | 516 |
| Sold as stores .. | — | 383 | 117 | — | 249 |
| Ewe lambs retained .. | 240 | 210 | 255 | 253 | 220 |
| Mortalities and killers | 47 | 57 | 80 | 78 | 30 |

lambs sold in the 1954-55 season were all killed as fats. That season was an extremely good fattening one, but in the following season—remembered for its sharp drought—only 233 were fattened and 383 sold as stores. Mr Newton confirms that this was the usual picture in the drier years.

But in the 1958-59 season, **in which there was the most severe drought on record, 516 lambs out of a possible 765 were sold as fats**. This included one draft on 21 November, which, for Banks Peninsula, is extremely early even in a good fattening season. This underlines an important farm management feature; not only does a well designed topdressing programme ease the winter feed position by prolonging autumn growth and promoting earlier spring growth, but it forces a new approach to the utilisation of feed available, particularly in spring and early summer.

The most obvious step has been earlier lambing to ensure that there is no waste of the available feed, and with increased stocking rates, early drafts of lambs can be quit and the ewes done hard, thus easing the feed position. The Akaroa County survey showed late weaning to be a feature of Banks Peninsula farming. Thus, in a dry season ewes claimed the major share of what good grazing there was, but were probably providing only a token quantity of milk. Lambing, which normally began on Mr Newton's farm about 21 September, in the 1958-59 season started on 21 August.

Lambing percentages in 1956 and 1957 were unsatisfactory, but this can scarcely be attributed to any feature of the development programme. However, apart from having more lambs to sell now, Mr Newton can be reasonably sure, after the drought experience in 1958-59, of fattening about 60 per cent of all lambs tailed, but he must aim in future at higher lambing percentages.

Another trend on this farm is for more lambs to be carried through winter to be fattened to catch the butchers' market in spring. Romney ewes and both Romney and Southdown rams are used. Lamb and adult sheep mortality has been about average for Akaroa County.

**(d) Cattle**

As mentioned earlier the running of cattle allowed greater flexibility of management in the early years of development, as numbers could be increased or decreased according to the seasons. Cattle should continue to play an even more important part; if desired, a further increase in carrying capacity could be in cattle rather than in breeding ewes. All cattle irrespective of age and sex have been included under one heading for comparison—actually the break-up is similar for all years. The number has increased from about 45 to 75. In addition, over the past two winters dairy stock have been grazed—32 cows for three to four months in 1957-58 and 22 for the same period in the winter of 1959. This stocking has been allowed for in computing the total ewe equivalents carried.

Country on the inner harbour, Akaroa, similar to that on the demonstration farm and which could be developed by the methods used on that farm.

A point of some importance is that gross returns for cattle have increased as follows:

Average annual returns:

| | £ |
|---|---|
| First 2 years .. .. | 429 |
| Past 2 years .. .. .. | 1,138 |

A buoyant market has helped. Taking purchases into account the change in gross profit on cattle has been:

Average annual returns:

| | £ |
|---|---|
| First 2 years .. .. .. | 357 |
| Past 2 years .. .. .. | 888 |

As there are no overhead costs of any importance which would not be incurred in running sheep, the above figures reflect to some extent the economic importance of cattle.

## Development Costs

The costs to 30 January 1958 of development for the 477 acres now owned may be summarised as follows:

| | £ (approx.) |
|---|---|
| Fertilisers, including spreading .. .. | 3,156 |
| Fencing .. .. .. | 525 |
| Additional cattle .. .. | 500 |
| Additional sheep .. .. | 500 |
| Other expenditure (including water supply) | 575 |
| Total .. .. .. | 5,256 |
| Development costs per acre .. .. .. | 11 |

Further development costs until 1961-62, including manures and their application, new fencing, and additional stock are estimated at: 1959-60 £700, 1960-61 £700, 1961-62 £600; total £2,000.

Total development costs for the whole experiment should be about £7,250 or £15 per acre. By 1962 the farm should carry 1,000 ewes, 300 hoggets, 100 other sheep, and 90 cattle or 3.8 ewe equivalents per acre compared with 2.1 in 1954-55 and the county average of that year of 1.8.

**Thus for £15 per acre stocking should be increased by at least 1.7 ewe equivalents per acre.**

What is important, too, is that experience over the past few years has shown that this programme could be carried out for £2 per acre less by topdressing with molybdenised superphosphate where basic slag was used.

Rail and cartage costs to get the manure to the farm are heavy, as the following details of aerial application of 19 tons of basic slag show:

| | £ | s. | d. |
|---|---|---|---|
| 19 tons of basic slag ex store .. .. .. | 323 | 0 | 0 |
| Railage Christchurch-Little River .. .. .. | 20 | 10 | 1 |
| Cartage Little River-Paua Bay .. .. .. | 37 | 11 | 6 |
| Spreading costs £4 per ton | 76 | 0 | 0 |
| Total .. .. .. | 457 | 1 | 7 |
| Total per ton .. .. | 24 | 1 | 2 |

Molybdenised superphosphate costs £19 7s. 7d. per ton applied, molybdenised DDT superphosphate £26 12s. 1d. per ton; DDT superphosphate £26 4s. 1d., and superphosphate £18 9s. 7d. per ton.

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*In a small paddock of grass seed an excellent sample of clean seed was produced although I did mainly grain. In one crop of Aotea wheat, which also went over 100 bushels, the Europa filled 70 bags in 50 minutes. I do not need to tell you how pleased I am with performances like these. The ease of operation and the simple adjustments are most impressive, but I think the bagging arrangements could be improved. It is an ideal size self-propelled header with the right capacity for our crops.* *J. A. FOWLER,*

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## Fencing

Fencing costs consisted of:

| | Material | Hired labour | Total | Cost per chain |
|---|---|---|---|---|
| | £ | £ | £ | £ s. d. |
| No. 1 fence (32 ch.) .. .. | 223 | 12 | 235 | 7 7 0 |
| No. 2 fence (31 ch.) .. .. | 164 | 6 | 170 | 5 10 0 |
| No. 3 fence (18 ch.) .. .. | 120 | | 120 | 6 13 0 |

Fencing was erected by the farmer and a permanent employee, and their time was not costed and included in the above figures.

Other development consisted chiefly of an improved stock water supply and a contribution toward the airstrip.

Two of the fences were probably necessary quite apart from the need for closer subdivision to take advantage of the extra feed resulting from topdressing.

## Was Income Sufficient?

This was a freehold property and total investment including plant and stock was valued at £20,000. It is not proposed to trace the financial results year by year; the inevitable time lag between the development inputs and cash returns as a direct outcome of such inputs is discussed later under "Rate of Development". In Table 5 annual receipts and payments for the five years are shown and then are totalled in the final column.

TABLE 5—RECEIPTS AND PAYMENTS

| | 1954-55 | 1955-56 | 1956-57 | 1957-58 | *1958-59 | Total |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| **Receipts** | | | | | | |
| Wool .. .. .. | 2,481 | 2,391 | 3,272 | 1,668 | 2,440 | 12,252 |
| Lambs .. .. | 1,808 | 1,325 | 1,319 | 1,405 | 1,447 | 7,304 |
| Other sheep .. .. | 299 | 328 | 436 | 361 | 355 | 1,779 |
| Cattle .. .. | 519 | 339 | 469 | 1,400 | 876 | 3,603 |
| Sundry .. .. | — | 29 | 15 | — | — | 44 |
| Total .. .. | 5,107 | 4,412 | 5,511 | 4,834 | 5,118 | 24,982 |
| Total per acre .. | 9.0 | 7.8 | 9.7 | 8.5 | 10.7 | |
| **Payments** | | | | | | |
| Wages/contract .. | 549 | 567 | 578 | 571 | 566 | 2,831 |
| Manures .. .. | 599 | 726 | 721 | 644 | 466 | 3,156 |
| Cattle .. .. | 144 | — | 548 | 295 | 205 | 1,192 |
| Other running expenses | 936 | 986 | 678 | 1,025 | 854 | 4,479 |
| Development expenditure .. .. | 353 | 470 | — | 280 | — | 1,103 |
| Taxation .. .. | 623 | 369 | 804 | 392 | 793 | 2,981 |
| Total .. .. | 3,204 | 3,118 | 3,329 | 3,207 | 2,884 | 15,742 |
| **Cash surplus** .. .. | 1,903 | 1,294 | 2,182 | 1.627 | 2,234 | 9,240 |

* Acreage reduced from 566 to 477.

The table is not concerned with the nature of the expenditure—whether capital or revenue—but it is intended to show where the money came from and how it was spent. Money had to be found for the items listed, including £3,000 for taxation, and after meeting all running expenses, farm overheads, taxation, and all development expenditure there was a cash surplus of £9,240, but no allowance has been made for farm living expenses.

This £9,240 has been deflated by: (a) allowing for wages in 1957-58 and 1958-59 (£1,137), when no permanent labour was employed; (b) taxation higher than actually paid, as adjustments have been made to allow for PAYE concessions in 1958.

The fluctuating receipts for wool, despite increasing output, and the growing importance of cattle are notable. Above all, in 1958-59 despite (a) the most severe drought on record and (b) falling prices for farm produce, total receipts are maintained at about £5,000 and from a smaller area (90 acres were sold) and the return per acre has increased from £9 to £10 14s.

Over the five years £3,156 has been spent on manures and associated costs; £1,103 on fencing and other development expenditure, and £1,192 on cattle; taxes have absorbed £3,000. Most of the farm development has been treated as an allowable expense for taxation purposes and though it would have been of great assistance not to have paid £3,000 in taxation, it could not be said with any conviction that taxation is a deterrent to the development of this class of hill country.

Summing up, farm receipts have been sufficient to meet all expenditure including development, running expenses, and taxation without recourse to borrowing and there has been a sufficient balance to ensure a reasonable standard of living.

## Rate of Development

Taking into account the usual factors associated with any land development scheme, particularly the varying climatic conditions, it is doubtful whether this type of hill country development can be speeded up. It will take seven years to increase the carrying capacity by at least 1.5 ewe equivalents and this compares favourably with districts in the North Island where similar development is taking place. For example, on a similar project on the east coast of the North Island, the carrying capacity increased from the equivalent of 2.6 ewes per acre in 1950-51 to 4.2 ewe equivalents in 1957-58. Over the same period wool production increased from 19 lb to 42 lb per acre. On another hill country property (near Palmerston North) the carrying capacity in 1950-51 was equivalent to 1.9 ewes per acre whereas today it is 3.2 ewe equivalents per acre. The wool production increased from 14 lb to 23 lb per acre.

As not much was known about hill country development on Banks Peninsula in 1954, it was only natural that many farmers would not be considered a satisfactory credit risk, particularly if they did not have full equity in their holdings. It is hoped that this demonstration farm's progress will help to dispel doubts about the economics of developing and improving Banks Peninsula land.

In any land development project one does not stop spending money when more and better grass is produced; there is nearly always fencing, perhaps stock water supplies or drainage, and additional stock (or the foregoing of some revenue by retention of lambs for flock replacements). There is a compounding effect which can well vary from district to district. This point is frequently overlooked by enthusiasts who urge more rapid development.

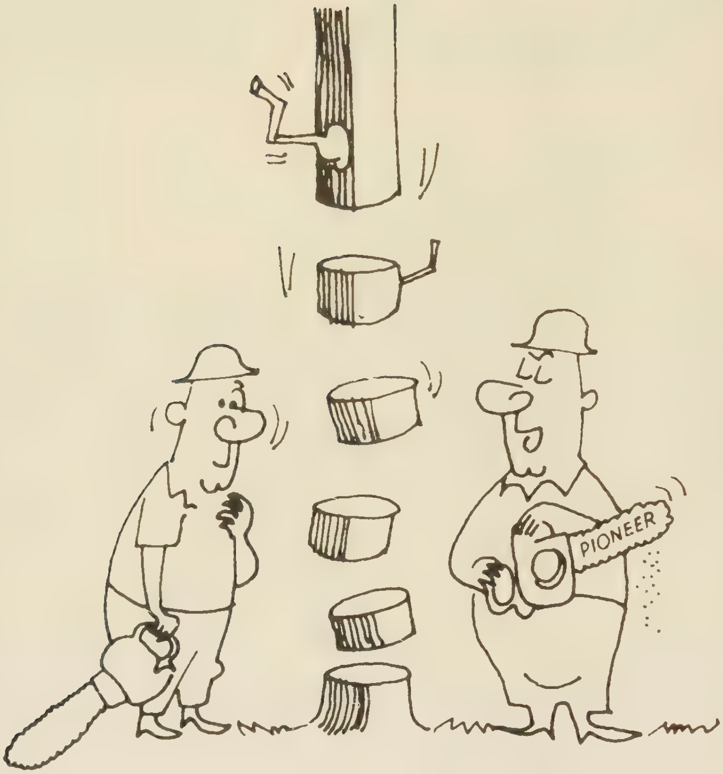
In Akitio County the Department found that in the early years of farm development for every £100 spent £43 had to be spent on additional livestock. On this Akaroa farm for every £100 spent on land development about £20 had to be found for additional stock.

These are not standard ratios, but emphasise that cash expenditure does not end with direct land development costs, and if land is being improved out of surplus revenue, development is not rapid.

In common with other land development projects, there is that period, perhaps three or four years, when a lot of money is being spent without a corresponding increase in returns; then quite quickly there is a "breakthrough" and cash surpluses accrue.

## Investment Returns

So far we have discussed the pure cash position, but to date has all this re-investment of surplus revenue (it could have been borrowed capital) to



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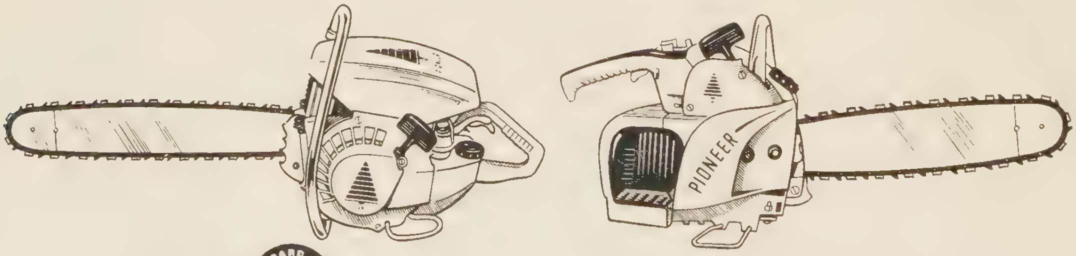

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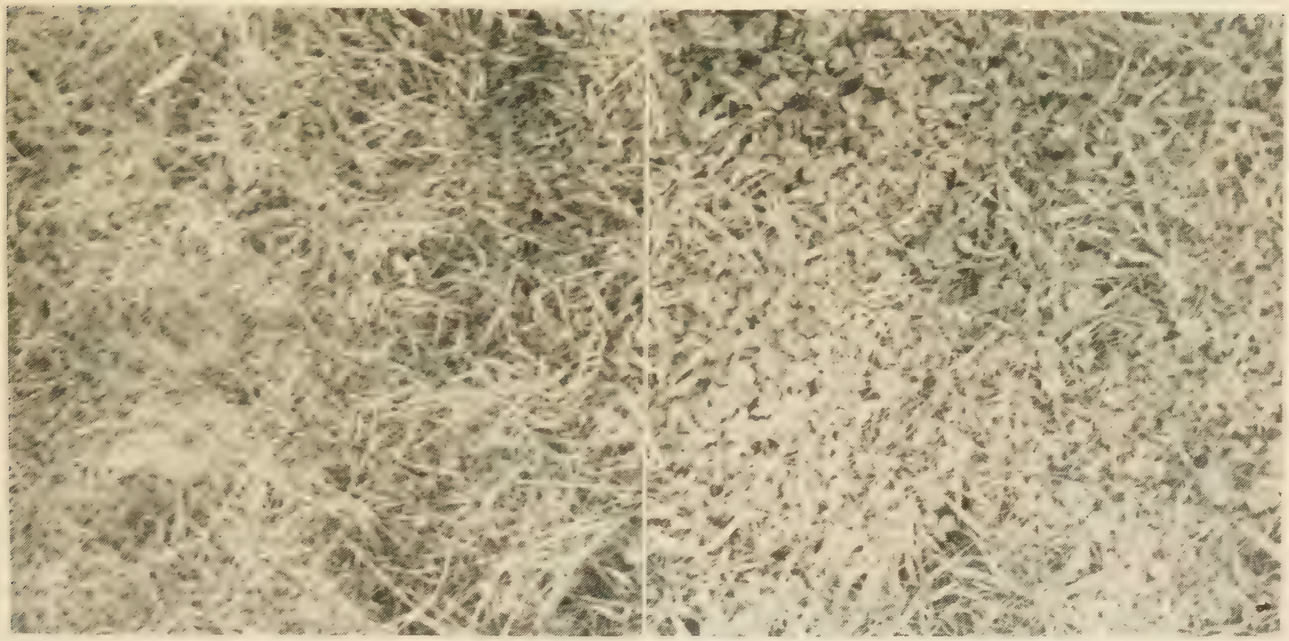

Results of surface sowing of subterranean clover and topdressing with 3 cwt of basic slag per acre at Paua Bay. Sward before treatment (left) and after (right).

improve the physical output of the farm resulted in a sounder investment?

This could be measured in a number of ways, but two net figures are used: 1, owner surplus; 2, return on investment.

### 1. Owner Surplus

The owner surplus is the amount available to the owner to provide for living expenses, taxation, and investments (such as principal repayments on a mortgage) after meeting all farm running expenses, depreciation of assets, and interest at 5 per cent on the total value of the assets (£20.000).

TABLE 6—OWNER SURPLUS

|  | £ |  | £ |
|---|---|---|---|
| 1954-55 | 1,937 | 1957-58 .. | 1,220 |
| 1955-56 | 997 | 1958-59 .. | 1,931 |
| 1956-57 | 2,154 |  |  |

Of course, as the property is freehold, the 5 per cent interest (£1,000) on the value of the total farm investment is available to the owner in addition to the above surplus. On the basis of present prices and costs, and taking into account that benefits from development work have not yet been fully realised, it cannot be said that the undertaking has been uneconomic. Or to look at Table 6 another way: If the farm was mortgaged to its present value at a 5 per cent rate of interest, the owner would still have the surplus shown in Table 6 to meet living expenses, taxation, and principal repayments.

### 2. Return on Investment

Return on investment was computed by taking the net profit and adding to it interest paid on loan, which gave £2,931. From this amount was deducted a wage allowance to the owner and a management allowance, the latter being assessed at 10 per cent of the gross profit. The resulting investment return was £2,118 or 10.6 per cent of the total value of the investment in the enterprise.

Though the demonstration is by no means complete and is but one instance of development in Akaroa County, some of the salient features of any such project have been highlighted:

- Pasture deterioration has not only been arrested but higher producing swards are being established. At the same time there has been a significant increase in the output of wool, lambs, and beef.
- The owner feels he now has a sounder grip of the management of his farm and can plan ahead with a greater degree of certainty than previously.
- At present prices it is possible to develop this hill country economically from surplus revenue.
- Where development is being done from surplus revenue, carrying capacity cannot be raised rapidly, but the rate achieved compares favourably with those on similar North Island projects. To date, carrying capacity has been increased by one ewe equivalent per acre for £11; under full development, stocking should be increased to the equivalent of two ewes for £15 per acre.
- Taxation cannot be said to have acted as a deterrent to development.
- Borrowing, if necessary, even on the lower producing holdings on Banks Peninsula, need be limited almost to only seasonal overdrafts, but sympathetic administration of any existing mortgages is a prerequisite to the successful development of hill country.
- Not only has development been carried out from surplus revenue, but the earning power of the farm as an investment has been enhanced, even in a severe drought season combined with falling prices.
- The benefits of the overall programme to date are only now becoming evident; the picture when the programme has been completed in 1961-62 should be even more favourable.

---

## Recommendations for Farming Development on Banks Peninsula

### Topdressing and Oversowing

On the loess soils (which occur on about four-fifths of the peninsula) the main deficiency is phosphate. Experiments in recent years have shown that molybdenum gives a response on at least half of these soils. Therefore, recommendations are for an initial dressing of 3 cwt of molybdenised

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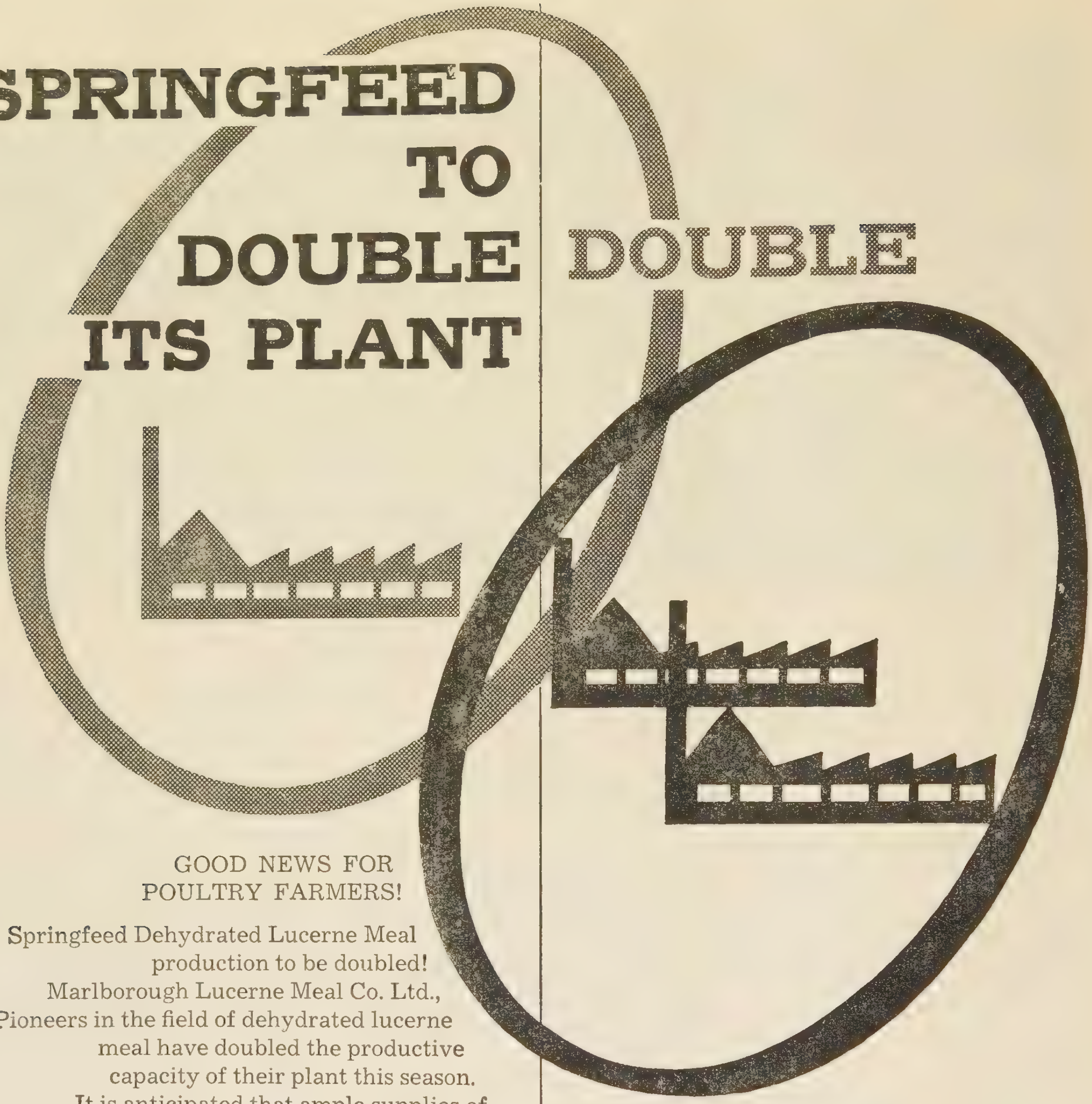

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superphosphate, followed by two further dressings of 2 cwt of superphosphate, and thereafter 3 cwt of superphosphate every four years. Molybdenum would have to be reapplied only if clovers started to go back or appeared yellow and unthrifty.

The volcanic soils have given only slight response to phosphates and no response to molybdenum. Where these soils are topdressed, straight phosphates (either basic slag or superphosphate) are preferable.

A few areas which have a low pH and low lime content require 1 ton of lime per acre, which should be applied if practicable. Any areas sown down to new grass would also be worth treating with lime at 1 ton per acre.

It would be sound practice to incorporate DDT in the topdressing at some stage in the programme for at least partial control of grass grub and subterranean caterpillar.

On dry faces subterranean clover (half Tallarook, half Mt Barker) at 2 lb per acre and certified white clover at 1 lb should be oversown in autumn. On damp, cold faces certified Montgomery red clover at 2 to 3 lb per acre and certified white clover at 1 to 2 lb per acre may be oversown, preferably in late winter (July-August).

## Subdivision

Subdivision as practised at Paua Bay is considered essential for the success of any topdressing programme. On some farms little fencing may be necessary; on others considerable fencing may be required before topdressing can be undertaken.

Subdivision must be accompanied by installation of adequate water supplies.

## Supplementary Feed

About 30,000 acres on Banks Peninsula has been ploughed at some time. There are now 120 tractors on the peninsula, but they cultivate less than 400 acres of supplementary crops altogether each year. It is considered that 20 per cent of the farms on Banks Peninsula could grow sufficient supplementary feed for their own requirements and they should be doing so. Most types of supplementary feed commonly used in other districts, including lucerne, do well in the area. Farmers who have a sufficient area of ploughable land have no reason to be short of feed even in droughts or severe winters.

However, few farms are sufficiently large to justify individual ownership of a full range of cultivation equipment, but in several areas cooperation between farmers owning different types of implements has allowed all of them to carry out the cropping work they require.

There is a need for reserves of hay on Banks Peninsula. As not more than 20 per cent of the farms could produce their own hay, it would be necessary to buy hay when it is cheap and to store it until required in periods of absolute scarcity, which may not eventuate for two or even three years. This precaution is particularly desirable for cattle.

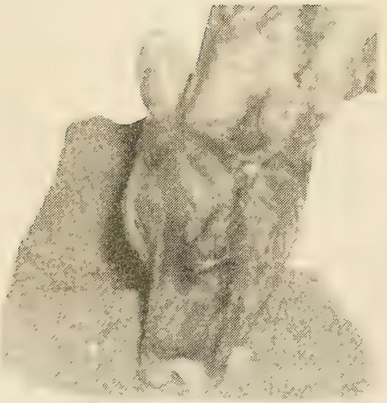
Topdressing has reduced the period in winter when food is short at Paua Bay and has eased the summer feed position also. But in periods of no growth (extreme drought or snow) there will be twice as many stock to feed per acre on developed and topdressed land as on unimproved areas. All farmers should maintain reserves of hay.

## Stocking

In the development of a one-man unit a stage will be reached where the number of ewes rises to the limit which may comfortably be managed, though this limit has not been reached at Paua Bay. However, the suitability of this farm (and many others on the peninsula) for the fattening of cattle suggests that after a certain stage a large part of the future increases in carrying capacity could be in the form of cattle rather than in breeding ewes. This also allows more flexibility in adjusting stock numbers to the feed position.

The programme of development at Paua Bay has been as successful economically and physically as was envisaged. A similar pattern of improvement could be achieved on many other holdings on Banks Peninsula, resulting in a general upward trend in production in the area.

# Feeding Brewers' Grains



TO keep up milk production in times of feed shortage some town milk suppliers feed brewers' grains. Methods of feeding and storage of this by-product are important in the achievement of worth-while results.

THE barley grain used in brewing becomes a waste product once the beverage has been brewed. Because of the grain's high water content, cartage over long distances is not economical. It must be collected daily and its use is practical only on farms close to a brewery.

## Feeding

The wet grain should be drained for at least 12 hours before being fed to cattle. Wet grain contains about 80 per cent of moisture; the dry matter contains carbohydrate and protein. The feed value is approximately that of good pasture.

Wet brewers' grains may be fed from 20 to 30 lb per cow per day; some fibre, in the form of hay and pasture, would also need to be fed. It can also be mixed with a concentrate feed at the rate of 4 lb of wet grain to 1 lb of concentrate. As brewers' grains become drier they become less palatable and the quantity fed should be about 6 lb per cow per day.

**Where brewers' grains are fed wet it is most important that they be fed within three days of collection. Spoiling results from acidity and mould formation.**

To avoid milk taint grains should be fed **after** milking. Containers should be well cleaned after use and placed in the sun.

## Storage

At certain times of the year there will be a surplus of brewers' grains. This surplus can be stored in a concrete four-sided silo which has free drainage at the bottom. By adding 25 lb of common salt to each ton of grain and placing a heavy cover on top to consolidate the material, brewers' grains can be kept for many years. When the silo is opened up the material has the consistency of cheese.

—*G. CHAMBERS,*
*Livestock Instructor,*
*Department of Agriculture,*
*Papakura*

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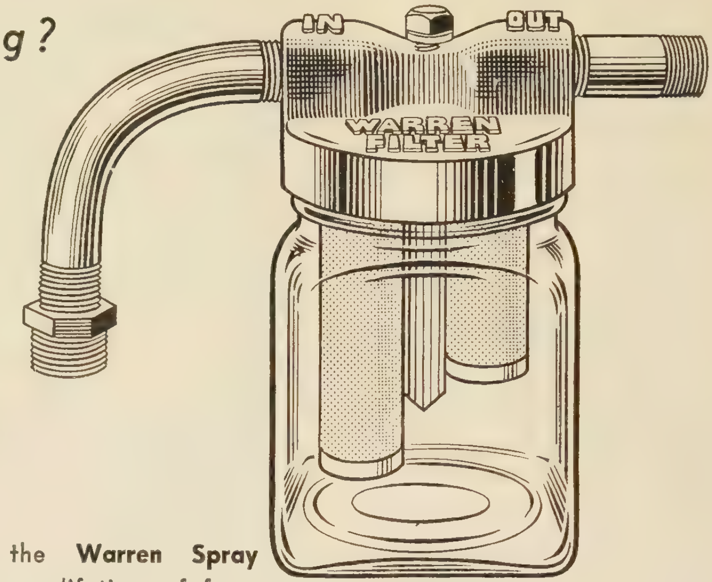

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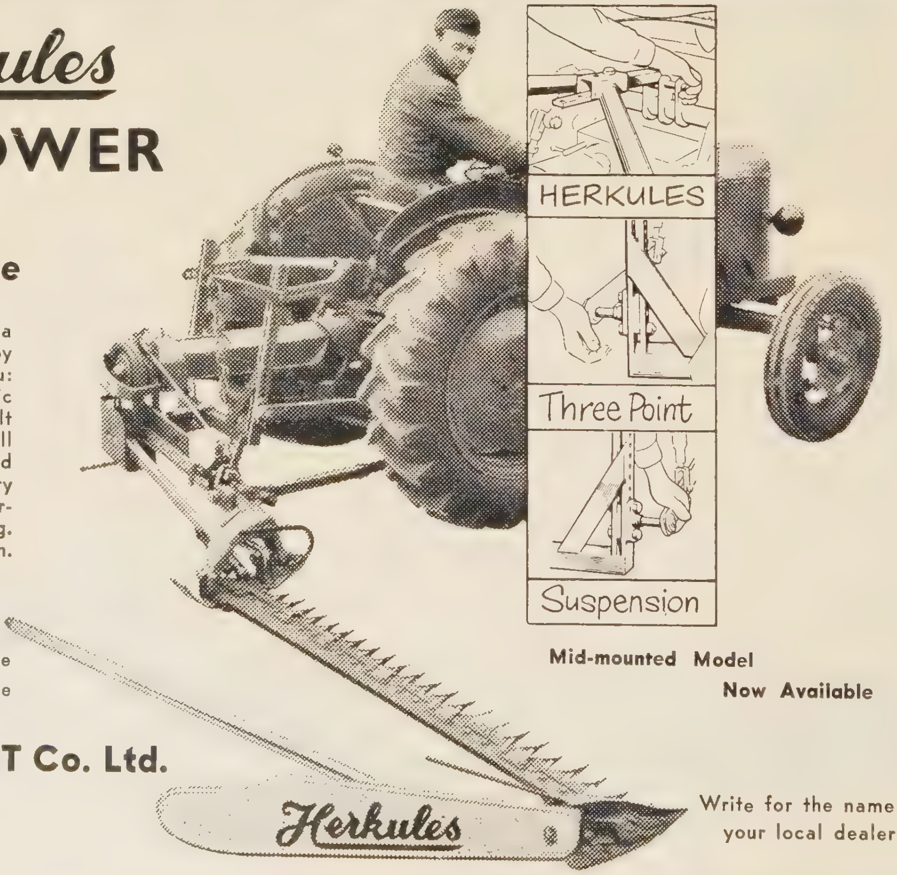

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# Progress and Problems in Artificial Breeding

SINCE the first commercial artificial breeding groups started in 1949, when 1,600 cows were inseminated, growth has been very rapid and sustained, with 420,000 cows artificially bred last year and an annual increase in use of the service of about 80,000 cows. Dr J. P. James, who led the first experimental work in artificial breeding at the Ruakura Animal Research Station, later became Director of the New Zealand Dairy Board's Artificial Breeding Centre at Newstead, near Hamilton. Progress and problems in the service were discussed by him in a paper to the Ruakura Farmers' Conference in June, an adaptation of which follows.

Dr James.

ARTIFICIAL breeding has developed to a stage where the pattern of commercial service familiar to us for the past 10 years will shortly be showing some change. In a few important respects artificial breeding in New Zealand has differed from that in other dairying countries; firstly, our work has grown in a way to meet a highly seasonal demand from a single centre for the whole country, and, secondly, our methods of handling bulls have been different. To meet the continued rapid growth of artificial breeding, changes are inevitable, bringing in their train special problems. This is a suitable time, therefore, to give a short account of the present position in A.B. in this country and to discuss some of the problems facing future expansion and their remedies.

## Growth of A.B.

During the past year 420,000 cows have been artificially bred. On the present dairy cow numbers in the Dominion this represents a coverage of about 20 per cent. Compared with the percentages in some other dairying countries this proportion may not appear high, but since the earliest commercial groups were started in 1949, when 1,600 cows were inseminated, the growth has been extremely rapid and sustained, the present rate being about 80,000 cows annually.

As artificial breeding in New Zealand is regarded as solely a herd improvement scheme, users do not as a rule aim to settle more than 80 per cent of their herds, as this proportion has been found to be satisfactory if all herd replacements are to be obtained from the A.B. stud. Hence A.B. will be used in a higher proportion of the herds in the country than the percentage of cows would suggest. A.B. appears now to be used in nearly 30 per cent of the dairy herds of 10 cows or more. For similar reasons the A.B. service is just as attractive to the larger herds in the country, the average herd size in the scheme in this area being 71, of which on average 76 per cent, or 58 cows, are artificially bred.

In the Auckland Herd Improvement Association's area, and there probably would not be any difference in other areas, out of 172,525 cows bred artificially, 2,257, or 1.3 per cent, were registered pedigrees. Of the 2,257 pedigree cows inseminated, 526 were done under the nominated service scheme in which breeders may select any bull from the list of bulls in the Nominated Service Bull Catalogue. Of a total of 2,836 cows bred to the nominated service in this area, the pedigree use amounted to 18.5 per cent, a rather disappointing figure in view of the fact that the list contained some of the better rated bulls as well as some from the best known and most fashionable studs in the country.

It is encouraging therefore to know that arrangements are practically concluded between the Dairy Board's Artificial Breeding Committee and the Council of the Jersey Breed Society to locate at the Dairy Board's centres bulls selected by the breed society for the use of its members throughout New Zealand. I understand that service from this group of bulls will be available also to other A.B. users.

Selection of bulls for this service will be entirely in the hands of the Jersey Society, so that the assertion that is often made by breeders that the best bulls in the country are not found at the A.B. Centre can no longer be sustained. The importance of this arrangement is that the period of uneasy liaison between the largest breed society in the country and the A.B. organisation is ended and can be replaced by open cooperation, which, with good will on both sides, should encourage pedigree breeders to make much greater use of this service. This progress could have been achieved only with the assurance of cooperation from the various Herd Improvement Associations in the field side of the work.

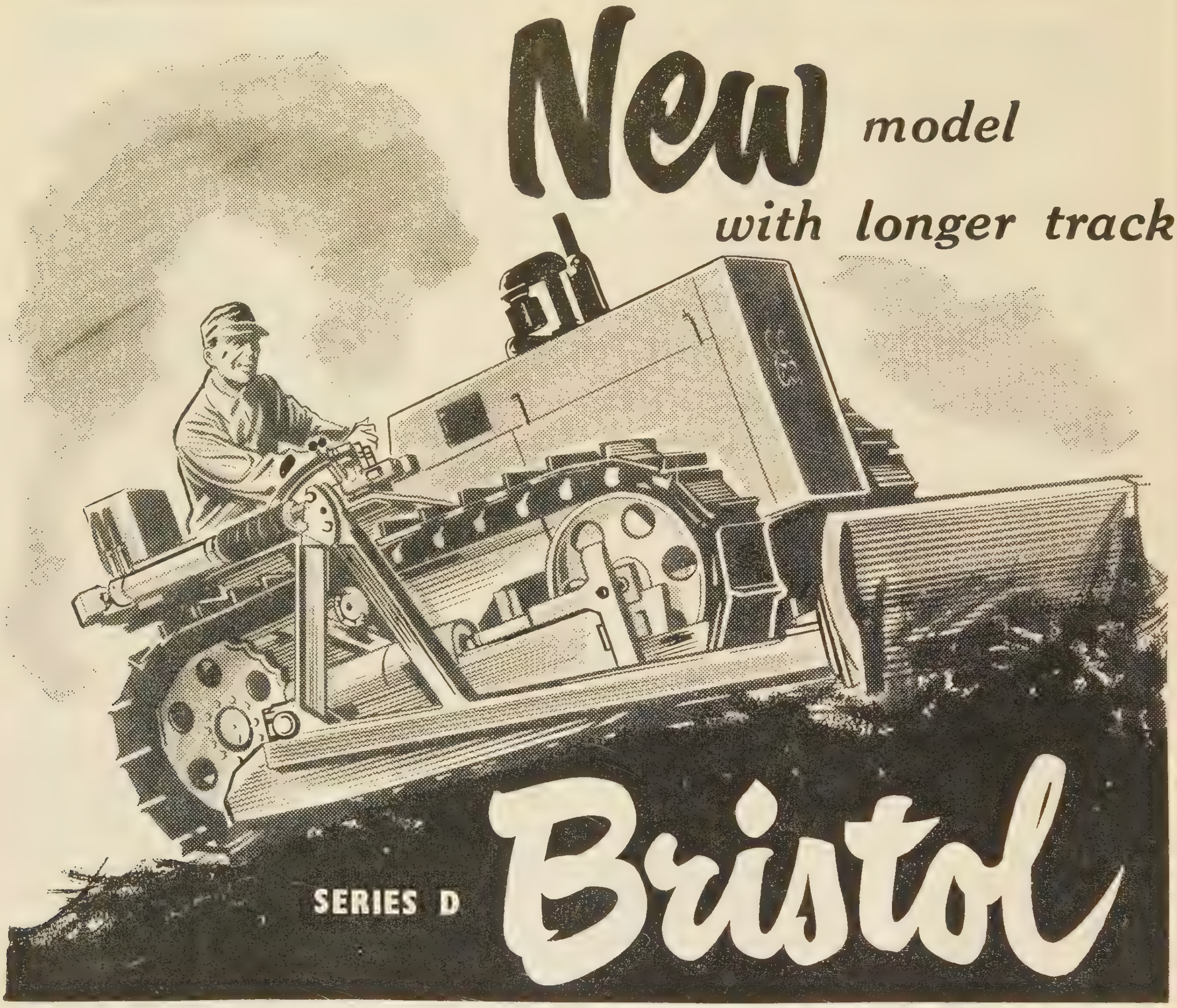
A start may be made in this new scheme in the coming breeding season, but it must be clearly understood that it is a breed society scheme for which the A.B. Centre and the Herd Improvement Associations are servicing organisations. Other breed societies may wish later to make use of similar facilities for their members, but it must be emphasised that only breed societies as a whole will be given facilities for a similar service and not individuals or groups of individuals within a breed.

To overcome distribution problems this type of service would largely have to be limited to what can be done through deep-freeze banks, and we must be prepared to face occasional disappointments when it is found that some promising bulls do not give good results with the deep-freeze method.

Last season another dairy breed, the Milking Shorthorn, was added to the list of breeds at the centre. The team at present consists of two proven and five unproven bulls, with the expected addition of another proven bull before the coming season starts. Service is now available from four dairy breeds in the following order of popularity: Jersey 79.4 per cent, Friesian 12.4 per cent, Ayrshire 5.1 per cent, and Milking Shorthorn 0.9 per cent. The beef semen service is still available from the Polled Herefords, 2.2 per cent.

## New Facilities at Newstead

To deal with the continued rapid expansion of artificial breeding, additional bull housing and collection facilities have had to be provided at Newstead. A departure has been made in our approach to handling bulls. This is a bull barn for 40 bulls designed to house them continuously for lengthy periods. On the success of this unit will depend the adoption of this system on a more extensive scale at Newstead or any other centres.



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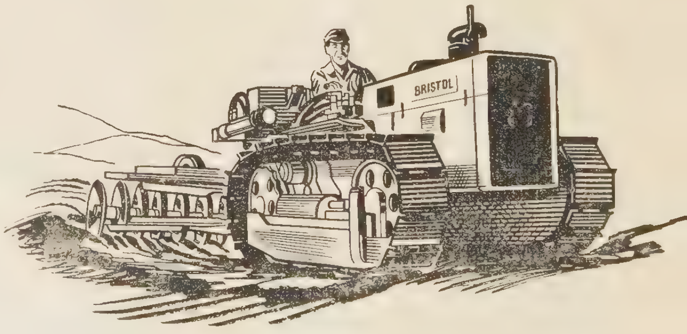

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### Development of Second Centre

**The most important addition to the service ability of the A.B. organisation in recent years is the purchase of a farm of about 200 acres at Awahuri, eight miles from Palmerston North, for developing into a second centre.**

It has been realised for several years now that Newstead could not go on expanding to meet the needs of the whole country, mainly because of distribution problems. These should be largely overcome when Awahuri comes into production, which will not be until next year. The coming season will be very difficult for distribution, especially as air services from Hamilton in the early morning are worse now than they were two years ago.

The second centre will provide service for the southern part of the North Island and the South Island, and the area being developed should meet all requirements from these districts for several years even if expansion continues at the present rate. The advantages in distribution will be obvious, and another important feature of a second centre will be the division of the bull team against the possible, though we hope very remote, chance of some infectious disease closing down one centre. (In New Zealand this may seem a very slight risk, though last year [during the outbreaks of mucosal disease] we thought otherwise.)

This same division of bulls will, however, create other problems, because relatively more bull power will be required for two centres, as wastage will be increased and the selection of bulls for each area will also be restricted. This will apply more to bulls of the Friesian, Ayrshire, and Milking Shorthorn breeds. Nominated service will be available from all suitable bulls at both centres to all users, and there will no doubt be some exchange of animals between the two centres.

### Conception Rates

For the past four years conception rates have been reasonably satisfactory, except in one area (Wellington-Hawke's Bay), which seems to contain some still unsolved problems, which were particularly evident during the past season, when the success rate was lower than for the three years immediately before. A substantial part of this drop appears at present to have been due to distribution difficulties which should be resolved next year, when Awahuri comes into production.

The conception rate is vital to the success of artificial breeding and the rate must be maintained at the highest possible level, particularly in New Zealand, where so much dependence is placed on regular seasonal calving. When proven bull power is short a balance must be struck between the ratio of proved and unproved bull semen. It is a question of giving the highest possible proportion of proven bull semen and at the same time maintaining a good conception rate. Most farmers would prefer a proved bull service of, say, 75 per cent with a conception rate of 60 per cent rather than 85 per cent proven service with conception rates below 60 per cent. This should be kept in mind during discussion of some of the problems facing the A.B. movement now.

### Experimental Semen

We are at last in a strong position to carry out some experiments within the A.B. movement. The most urgent problem is finding an improved extender for chilled semen. Several variations of existing mixtures are now being tried out with very promising results.

The keeping quality of diluted material from different bulls varies widely. If material from some of the poorer keepers could be improved, even for a few hours, it would raise the conception rates materially and also ease the ever-present problem of proven bull power.

## Beef Cows Also Susceptible to Contagious Abortion

BEEF cows are just as susceptible to contagious abortion as dairy herds, and many farmers have been able to increase the calving percentage of their beef cows by vaccinating heifers before mating.

Vaccination has reduced the New Zealand average rate of abortion in dairy cows from about 5 per cent to 1 per cent. Too many dairy farmers, however, still do not vaccinate their calves. Past freedom from abortion is no excuse for not vaccinating, as infection may be introduced into a herd at any time.

Though vaccination does not begin until early next year, applications should be made several months before to a Department of Agriculture officer or club veterinarian, as heavy itineraries have to be arranged.

### Deep-frozen Semen

Though this service is more expensive and the results in most areas rather lower than those from the use of chilled semen, the use of deep-frozen semen continues to expand. In 1959 a total of 9,258 cows were inseminated, of which 8,401 were classed as nominated services, 441 as "emergency" services (where frozen semen was used to overcome transport failures), and 416 as experimental deep-freeze, that is, testing out new bulls. Though the use of this material to meet transport failures was comparatively small, it was nevertheless extremely valuable in maintaining the service in the South Island.

Results, though still behind the chilled semen figures (53 compared with 59.5 per cent), seem to be attractive enough for many grade farmers to be interested in it.

Experimental deep-freeze semen is offered at chilled semen cost to encourage the use of new and unknown bulls. Last year, the first that this service was offered, the response was quite good.

### Production from A.B. Stock

A.B. in New Zealand is a herd improvement scheme and its success must ultimately be measured on this basis.

On the latest figures A.B. stock show an overall gain of 21 lb of fat, the figures being from 16,000 daughters of 61 bulls for which a comparison is available between their natural and their A.B. proofs. On the figures for the group the natural surveys showed a rating of 26. Only very few bulls have shown a disappointing drop from the natural survey rating to their A.B. rating, but the users of the scheme do not as a rule have many daughters from any particular bull and would thus not be affected by the results from one or two bulls.

The unproven bulls as a group show an overall improvement of 10 lb of fat. From present information it seems that we can expect about 40 per cent of these carefully selected young bulls to qualify as merit sires at a sufficiently high rating to join the proven bull team at the board's centres. But with the unavoidable losses occurring between the yearling or two-year-old stage until they can be proved, it seems that 25 per cent of an original intake of young bulls will eventually stand as merit sires.

Dairy farmers in New Zealand will appreciate the high production standard which was set at the start of this work and the maintaining of

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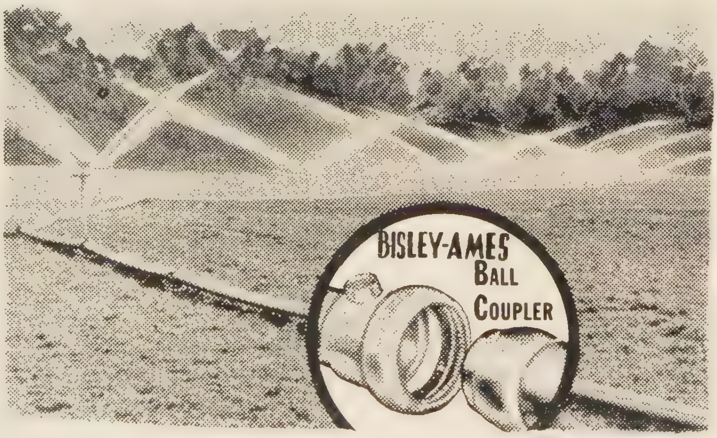

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a very satisfactory rate of improvement in the face of extremely rapid expansion. Whether this can be continued in the light of present facts is discussed more fully below.

## Problems in A.B. in N.Z.

Several problems face the various groups of workers concerned with providing this service throughout New Zealand. Some of these arise at the bull centres and others at distribution depots and in the Herd Improvement Department's continuous search for suitable bulls. Not the least in this last group are the difficulties Herd Improvement Associations face in organising training groups in the winter and commercial groups in the busy spring. The hours of careful planning necessary to establish smooth working groups for a short period (seven to eight weeks) and overcoming the frustrating habitual alterations to public transport timetables are rather taken for granted. The solution is in these instances under the control of the workers concerned, and by altering schedules and increasing facilities and staff such problems can generally be overcome.

Another class of problem the solution to which does not rest mainly on the technical or organisation aspects of the service, but on the users of it, is proven bull power in the future.

The fact that A.B. in New Zealand is solely a herd improvement measure means that the best bulls (judged on production) must be located and bought for the A.B. bull studs. That the efforts so far have been successful, more successful than in any other major dairying country, has been shown in the production figures quoted earlier. This success has been built on the sire survey scheme introduced as part of the Herd Improvement Plan of the Herd Recording Council in the late 1930s.

In its turn sire survey work is built up on herd testing. Those who have supported herd testing regularly have been the **only** source of the proven bull which has been used so successfully in our A.B. work.

It was stated earlier that 40 per cent of testing members were now using the A.B. service; hence these herds are lost to the organisation as far as naturally proved bulls are concerned. The fact has also to be faced that the percentage of A.B. users testing is dropping each year. This means that the potential for proving A.B. stock is falling.

These trends have been known for some time, and measures to counteract their effects have been tried, unsuccessfully it seems. It has been realised that as the A.B. service grew, more and more of the testing members would join, and the naturally proven bull would become scarcer. Each year therefore a group of yearlings was bought to be proved out within our own scheme.

### Need to Test Young Bulls

The arithmetic of the business is as follows: If it takes 100 proven bulls to provide a certain population of cows with an 80 per cent proven bull service, each year 100 young bulls must be brought in for proving. This is because we find that about 25 bulls out of a stud of 100 proven ones are lost each year through deaths, infertility, or accident, and it was estimated earlier that of each 100 bulls taken in for proving at the yearling stage only 25 were left to join the bull team if production standards were to be maintained.

The Herd Recording Department requires 50 heifers tested to give a satisfactory proof on each young bull, but very largely because of the fact that there is wastage at many points, 1,000 cows must be inseminated to each young bull to ensure 50 tested daughters. Owing to the very high wastage of this class of material in the field, we are faced with the ridiculous situation of having to collect and process 2,500 doses of semen from each yearling bull if we expect to have a proof on 50 tested daughters in three years.

Anyone who has had experience in the handling of bulls of about 14 months of age will realise that to achieve this target in the early part of the season needs the persistence of Hercules and the patience of Job. In spite of a display of these virtues it was extremely disheartening last season for the yearling collecting team to find that wastage in the field in most areas was extremely high, and that their best efforts had not resulted in as many young bulls reaching the target as was expected.

The cause for this very serious situation is simply that A.B. users will not take their share of the material from the young bulls; and because there is such a low percentage of users testing their herds, they are thus accepting the benefits derived from herd testing but are themselves failing to test.

Realising that this situation was developing, the Dairy Board three years ago offered a bonus of £5 for each heifer identified and tested from each of the young bulls being proved. It seems that this has not increased

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# Ruakura Research Station Given Valuable Collection of Books

MR J. M. RANSTEAD, of Matangi, a Waikato farmer with a wide knowledge of animal genetics, has given his library of 3,000 books to the Department of Agriculture's Ruakura Animal Research Station. The collection includes a comprehensive and valuable section on animal genetics, some of the books being the earliest publications on this subject.

Mr Ranstead, who was born in England and received his early education there, holds a diploma from Canterbury Agricultural College. A prominent breeder of Milking Shorthorns, Mr Ranstead is a former president and an honorary life member of the New Zealand Milking Shorthorn Association, and author of a history of the breed, which appeared in the "Journal" in 1950.

Mr Ranstead.

He was the first president of the New Zealand Society of Animal Production and is an honorary life member. He served on the Council of Scientific and Industrial Research from 1936 to 1954, on the management committee of the Dairy Research Institute from 1947 to 1956, and on the Ruakura Animal Research Station farm advisory committee from 1945 to 1950. In 1931 Mr Ranstead was awarded the Bledisloe Medal, which is presented annually to an old student of Canterbury Agricultural College for outstanding service to agriculture.

There have been few more familiar figures than Mr Ranstead's at Ruakura Farmers' Conferences, where he is received with the respect and esteem which are rightly his for his long association with and assistance to the work and objects of the Station. The generous gift of his library, which will be known as the Ranstead Collection, will be a fitting memorial in a fitting place to one who has been generous also with his time and energy in the promotion of better animal husbandry.

the use of the young bulls and has not made any difference to numbers testing.

What we must face also is the fact that if a young bull is not given enough cows for proving him out in the first year he is used, he has to come back again the following year to complete them. Therefore not using them one year means only that they are going to make a backlog for the next year, thus mounting up the numbers to be proved. This has now happened. There will be on hand next season 165 bulls (100 new ones and 65 as a backlog from previous years) to complete their quotas; this number, if everyone had used their share in past years, could have been reduced to 110. To catch up this season A.B. users will have to accept one service in four from unproved bulls. This means that there will still be a 75 per cent service from the proved team.

New Zealand now enjoys an A.B. service with a higher percentage of service from proved bulls than any other country. Unless the usage of young bulls can be raised to the level of 25 per cent, we must face a falling rate of improvement from artificial breeding in the future.

Unless we can get 25 per cent of the young bulls used this coming season, the value of A.B. will surely diminish. If a special effort could be made to use these young bulls for this season at any rate, it would make the lot of the field technicians much easier. It is not easy for relatively young technicians to insist that the "big shots" in the farming world on their rounds take their fair share. The position will be closely watched this spring.

If the daughters from these young bulls are not identified, and later tested, the scheme falls down again. It costs 1s. to have a heifer calf identified and there is £5 for it when it is tested. A few heifers qualifying for the £5 rebate would help quite materially in meeting testing fees.

### Use of Milk Metering Devices

Strenuous efforts are being made to replace one of the major obstacles to more extensive testing (that is, the testing buckets in the sheds) with milk metering devices. If these devices are successful, I hope herd testing will show a very substantial increase so that we can put the genetic resources of a much larger sample of our dairying animals to work through A.B. for the advantage of all dairy farmers in New Zealand.

There is no shortage of bull power in New Zealand, but obviously we are trying to sort out the few at the top to make them available to any dairyman in New Zealand who wants them. Whether we use the top 1 or 2 per cent or whether we have to dip more deeply and take the top 5 per cent depends on the quality and numbers of proven bulls available, which, as the bull team in the future must depend very largely on the numbers proved within the A.B. organisation, must in turn depend on the number of young bulls used today and proved tomorrow.

Unless greater use is made of the young bulls at our A.B. studs, users must expect a lowering of the present production gains. To avoid this a usage of 25 per cent of the unproven bulls is necessary, but with a bonus for identified tested daughters, which is at present £5, this should not be a very serious burden. If proven bulls of high standard become scarce, it may be necessary to increase the proportion of unproven bulls to safeguard the conception rate.

This is one of our most important problems in A.B. and one which users alone can solve.

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# Care Needed in Injecting Pigs with Antibiotics

ABSCESSES deep in the muscle tissue have been found in legs of pork and in hams. The Department of Agriculture considers that these blemishes have probably been caused by injections of penicillin cerate or other antibiotic substances which have either been outdated and inert at the time of use or been contaminated in some way.

It is considered likely that the use of dirty needles or failure to sterilise the skin at the site of injection has caused much of the trouble, and pathogenic organisms planted deeply in the tissues have produced abscesses which are not usually found until the joint is carved at the table.

The Department advises farmers using antibiotic injections for treating pigs to take the following precautions:

Don't use tubes of antibiotics after their expiry date.

Use a needle sterilised by boiling.

Clean the skin at the injection site with methylated spirit or a reliable disinfectant.

Inject into the area at the base of the ear; just behind the ear there is ample tissue into which the cerate can be squeezed.

Do not inject into the muscle tissue of the hams.

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# Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of November 1960:

### NORTH ISLAND

**October**

14 and 15 October—Poverty Bay A. and P. at Gisborne.
*18, 19, and 20 October—Hawke's Bay A. and P. at Hastings.
27, 28, and 29 October—Waikato A. and P. at Hamilton.
*28 and 29 October—Wairarapa and East Coast P. and A. at Carterton.

**November**

2 November—Cambridge A. and P. at Cambridge.
*4 and 5 November—Manawatu and West Coast A. and P. at Palmerston North.
11 and 12 November—Wanganui A. and P. at Wanganui.
11 and 12 November—Whangarei A. and P. at Whangarei.
*12 November—Clevedon A. and P. at Clevedon.
16 November—Thames Valley A., P., and H. at Te Aroha.
18 and 19 November—Egmont A. and P. at Hawera.
*19 November—Waihi A. and P. at Waihi.
19 November—Rotorua A. and P. at Rotorua.
19 November—Bay of Islands P. and I. at Waimate North.
*25 and 26 November—Auckland A. and P. at Epsom, Auckland.
25 and 26 November—Stratford A. and P. at Stratford.
30 November—The Plains A. and P. at Ngatea.

### SOUTH ISLAND

**October**

15 October—Ellesmere A. and P. at Leeston.
22 October—Northern A. and P. at Rangiora.
*29 October—Motueka A. and P. at Motueka.
29 October—Ashburton A. and P. at Ashburton.
29 October—Amberley A. and P. at Amberley.

**November**

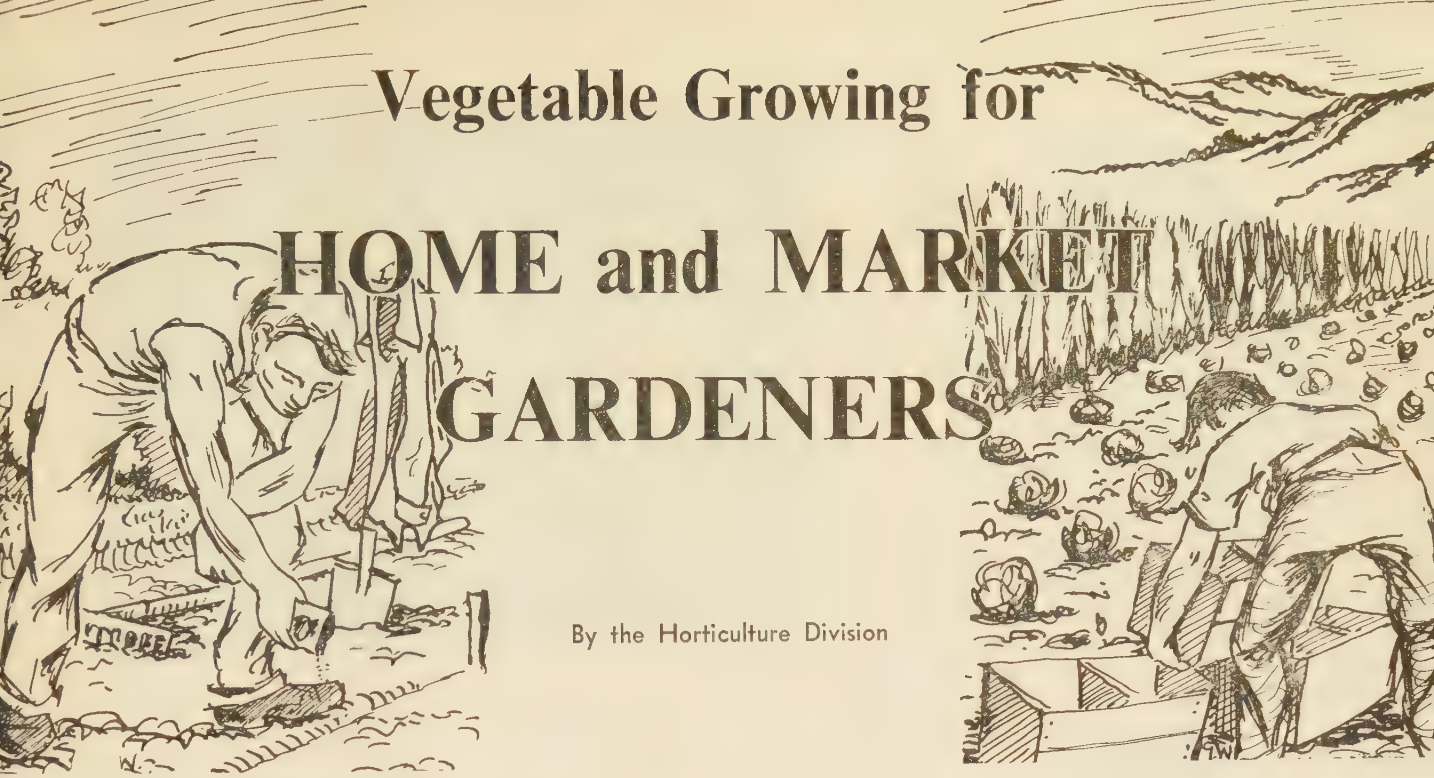
4 and 5 November—Marlborough A. and P. at Blenheim.
*9, 10, and 11 November—Canterbury A. and P. at Christchurch.
12 November—Tokomairiro A. and P. at Milton.
16 November—North Otago A. and P. at Oamaru.
18 and 19 November—Nelson A. and P. at Richmond.
19 November—West Otago A. and P. at Kelso.
19 November—Courtenay A. and P. at Kirwee.
*19 November—Waimate A. and P. at Waimate.
19 November—Taieri A. and P. (Centennial) at Outram.
*22 and 23 November—Timaru A. and P. at Timaru.
26 November—South Otago A. and P. at Balclutha.

* The Department of Agriculture exhibit will be staged at this show.

### IN UNITED KINGDOM

25-28 October—Dairy Show (livestock, dairy, and agricultural machinery equipment) at Olympia, London.
1-4 November—Fresh Food Packaging and Prepacking Exhibition (meat, poultry, eggs, etc.) at Alexandra Palace, London.
5-9 December—Smithfield Show and Agricultural Machinery Exhibition (livestock, meat, and agricultural equipment) at Earls Court, London.
7-9 December—National Poultry Show (poultry, ducks, geese, and turkeys, including equipment, etc., for the poultry industry) at National Hall, Olympia, London.
14-17 February—Scottish Dairy Show at Glasgow.

# Vegetable Growing for HOME and MARKET GARDENERS



By the Horticulture Division

## Potatoes

POTATOES are a most important food crop in New Zealand and are grown by farmers engaged in general agriculture and by market gardeners and almost all home gardeners. They have no decided flavour, but there are extremely strong preferences among consumers based on cooking quality, size, colour, and shape, and home gardeners' selections are often mainly guided by personal preference.

THE selection and introduction of new varieties have made possible a choice of potatoes suitable for producing profitable crops on a very wide range of soil types, many of which would have proved unsuitable for potato growing in the past.

Main crop potatoes are grown commercially in most areas of New Zealand, but over 75 per cent of the main crop comes from the South Island. Early crops are produced in the warmer frost-free districts.

### Selection of Varieties

Early selection of varieties to be grown is desirable and an order should be placed with a seedsman in sufficient time for the varieties to be obtained. It is a mistake to leave ordering of seed tubers until late in the season and thus because of poor supply be forced to substitute a less desirable variety.

Where home gradeners and commercial growers are in doubt as to choice of varieties for their district they may consult the nearest office of the Department of Agriculture. Department of Agriculture Bulletin No. 277, "Crop Production", price 2s., has a comprehensive section dealing with all aspects of potato growing.

The following descriptions of some of the best known early, main crop, and late varieties are intended as a reference for the home gardener who may wish to try new varieties.

**Aucklander Short Top** (sometimes referred to as Sutton's Supreme) is suitable for growing on the medium to light soils in both the North and South Islands. It can be grown as an early potato, but has a thin skin and must be handled carefully. Under reasonable conditions it produces a good proportion of table potatoes. This variety is popular in windy districts because its habit of growth is lower than that of many other varieties and thus it is less readily buffeted about.

**Aucklander Tall Top** is similar to Aucklander Short Top, but it matures three or four weeks later. The main advantage with this potato is that it produces heavier crops than Aucklander Short Top on lighter land. On soils of average or heavy texture the tubers tend to be coarse and misshapen.

**Arran Chief:** This popular variety has been grown in New Zealand for many years. It does well on medium to heavy land which is well drained. It produces a heavy yield of well shaped tubers which handle and store well.

**Arran Banner:** Medium to light soils suit Arran Banner best; on these it produces heavy crops of good quality tubers. The variety is relatively early and has become increasingly popular because tubers cook well even when immature. When grown on heavy land it produces large, rough tubers which frequently develop hollow heart. Arran Banner is grown widely on the lighter soils of both Islands.

**Chippewa:** This early main crop potato has a wide soil range and grows well in both Islands. Though it has a low growing habit, it has a foliage which is easily damaged by wind and does best in sheltered localities. Tubers are white, smooth, round, and of good quality. Chippewa is subject to blight.

**Red Dakota** is the only popular coloured variety grown in New Zealand. It does best on a sharp silt loam and is commercially popular in North and Mid Canterbury. It is popular with home gardeners in all parts of both Islands and good crops are obtained on various home garden soils, but on very heavy soils, misshapen tubers are often produced. Tubers have a good texture when cooked and tend to be favoured rather for baking than for boiling. Very deep eyes tend to make these tubers more wasteful than smoother varieties for culinary purposes. Many home gardeners consider this disadvantage is offset by the excellent keeping qualities of Dakota

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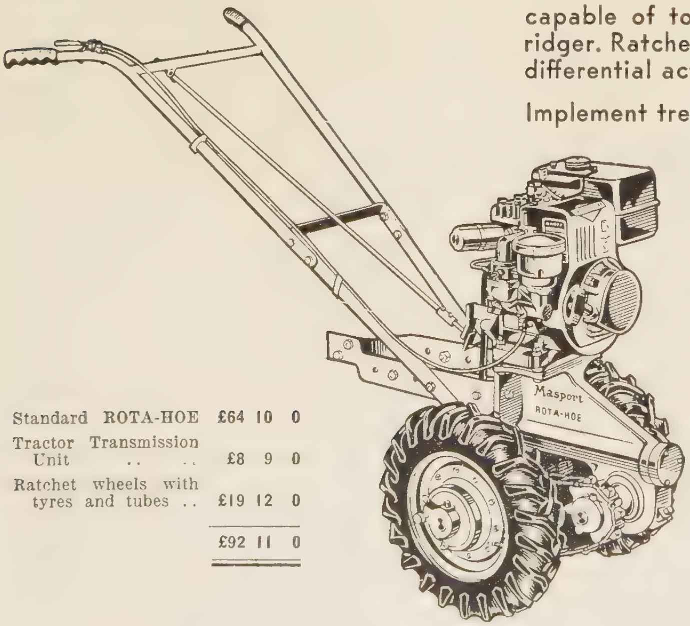
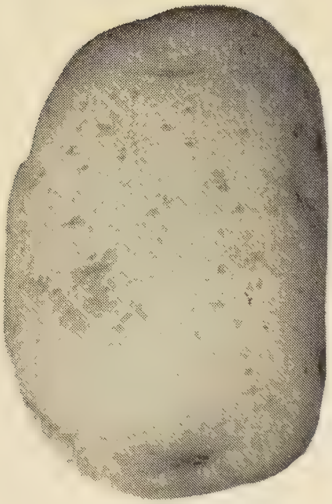
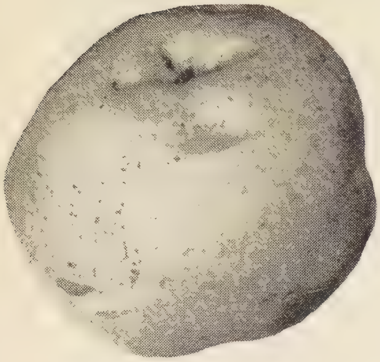




Aucklander Short Top.



Arran Banner.

Arran Chief.

**Doon Early** is a first early variety which grows well on a wide range of soils. It cannot be recommended for use commercially, but it has proved excellent for home gardens. Doon Early produces a smooth tuber of superior quality and matures rather earlier than Epicure, but the yield is a little lower. It is susceptible to late blight. Certified seed is not available for Doon Early.

**Dunbar Standard** is now becoming more widely known. It is very late and very tall. It produces heavy crops on a wide variety of soils in both Islands. Tubers are large, round, white, of very good quality, and store well.

**Epicure** is a popular home garden early variety. It produces good crops in medium to light soils, where under favourable conditions it will mature in 10 weeks. Tubers are round, rather deep in the eye, and develop a pinkish tinge in the skin after being dug.

**Ilam Hardy and Glen Ilam** produce excellent heavy crops of oval, white-skinned tubers on a wide range of soils. Ilam Hardy is earlier than Glen Ilam, a main crop variety. Ilam Hardy produces fuller, rounder tubers than does Glen Ilam, but of the same texture.

**Inverness Favourite** prefers a heavy but well drained soil to produce good crops. On light soils crops have a high percentage of small tubers. The tubers are round to oval and smooth skinned. Inverness Favourite is a main crop variety.

**Iron Duke:** The round tubers of Iron Duke make it an attractive potato for preparation. It is a heavy cropper which does well on heavy soils, provided they are well drained. A few commercial crops are grown, mainly in North Canterbury and parts of the Wellington Province, but it is grown more widely in home gardens. Iron Duke has reasonably good resistance to late blight, but is subject to the viruses mosaic and leaf roll and deteriorates very rapidly when infected with the latter.

**Jersey Bennes** is an early variety which yields well, but best in a cool climate and sheltered situation. It is more popular in the southern part of the South Island than it is further north. It grows in a wide variety of soils. It is subject to late blight.

**Katahdin** has similar growth characteristics to Chippewa. Both are early main crop potatoes and have tubers of similar size and colour. Both are susceptible to blight.

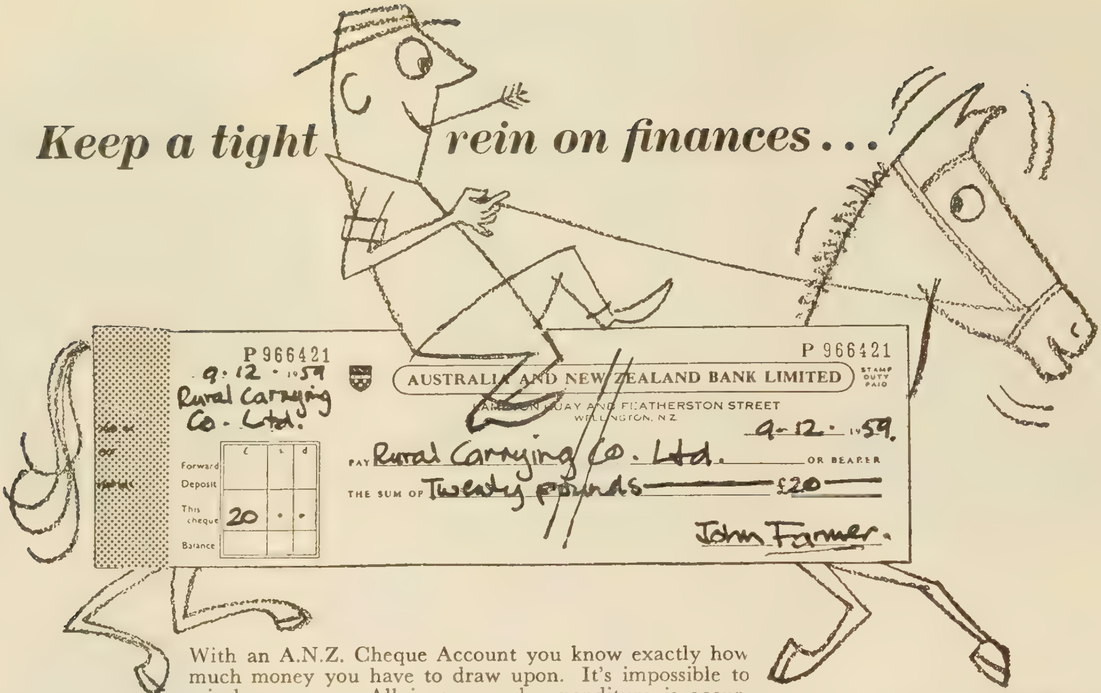
**King Edward:** This early main crop variety is a very popular potato in Otago and Southland. It prefers a cool climate without prolonged dry periods and tends to grow best in heavy to medium silt loams. The tubers are smooth skinned, oval, particoloured (white splashed with pink), and have shallow eyes. The variety is subject to late blight.

Chippewa.

Dakota.

**Northern Star:** The tubers of this variety are round and smooth with pink eyes. It is a late main crop variety suitable for heavy land. On anything lighter than heavy silts a large number of small tubers are produced. Northern Star is often found growing as a rogue in white-skinned varieties. It has lost popularity and is now seldom grown.

**Sebago:** A main to late variety of good quality that has shown consistently high yields during trials, Sebago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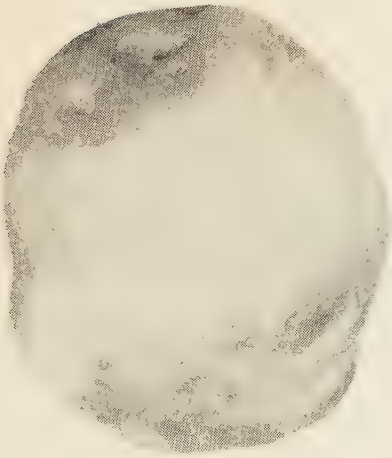
is becoming very popular among both home and commercial gardeners. It tolerates a wide range of soils and climate. The tuber is oval, white, with shallow eyes, and of excellent quality for cooking.

It has shown a tendency to succumb to infection with the fungous disease *Corticium*, indicated by gaps in the rows where tubers have failed to grow.

**Up-to-date:** This old main crop variety produces tubers of good shape and quality which will grow in a wide range of soils and climatic conditions, but it is not now widely grown because of its susceptibility to late blight and virus diseases. However, home gardeners still growing this variety are enthusiastic about it. Certified seed is no longer available for Up-to-date.

Dunbar Standard.


Epicure.

## Popular Varieties

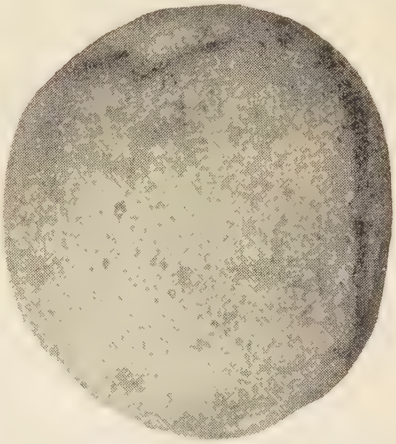
The following varieties are popular with home garden and commercial growers.

Varieties with the heaviest yield are not always the most popular, because of market preference and sometimes because a variety is not well known or is liable to damage and does not keep well. Some potatoes are used in different districts both as an early and late variety.

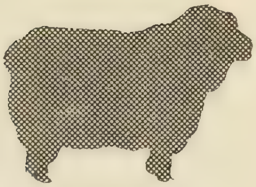
| Early | Mid season | Late |
|---|---|---|
| | AUCKLAND | |
| | **Home Garden** | |
| Cliffs Kidney | Arran Banner | Arran Chief |
| Epicure | Aucklander Short Top | Sebago |
| | **Commercial** | |
| Aucklander Short Top | Arran Banner | |
| Ilam Hardy | Aucklander Short Top | Sebago |
| Arran Chief | | |
| Epicure | | |
| | WELLINGTON | |
| | **Home Garden** | |
| Epicure | Inverness Favourite | Sebago |
| Katahdin | Aucklander Short Top | Iron Duke |
| Ilam Hardy | Glen Ilam | Inverness Favourite |
| Chippewa | Chippewa | Glen Ilam |
| Arran Banner | Katahdin | Dakota |
| | Dakota | |
| | **Commercial** | |
| Epicure | Aucklander Short Top | Sebago |
| | | Inverness Favourite |
| Arran Banner | Glen Ilam | Glen Ilam |
| | Iron Duke | Iron Duke |
| Ilam Hardy | | Dakota |
| | CHRISTCHURCH | |
| | **Home Garden** | |
| Epicure | Dakota | Sebago |
| Arran Banner | Aucklander Short Top | Arran Chief |
| Chippewa | Glen Ilam | Dakota |
| Katahdin | Sebago | |
| | King Edward | Glen Ilam |
| Ilam Hardy | Ilam Hardy | |
| | **Commercial** | |
| Epicure | Ilam Hardy | Sebago |
| Arran Banner | Dakota | |
| Ilam Hardy | Aucklander Short Top | Dakota |
| | Glen Ilam | Glen Ilam |
| | Sebago | |
| | DUNEDIN | |
| | **Home Garden** | |
| Jersey Bennes | King Edward | Sebago |
| | Red King Edward | Arran Chief |
| | Arran Banner | Inverness Favourite |
| | Arran Chief | |
| | Inverness Favourite | |
| | Katahdin | |
| | Chippewa | |
| | **Commercial** | |
| **Jersey Bennes** | King Edward | Arran Chief |
| | Red King Edward | Inverness Favourite |
| | Chippewa | Sebago |
| | Ilam Hardy | |

The varieties Chippewa and Katahdin are very similar and the stocks in New Zealand cannot be differentiated.

Inverness Favourite.


Iron Duke.

Jersey Bennes.



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Crinkle virus of potatoes; diseased and healthy plants.

## Seed

True potato seed is borne in small berries developed from potato flowers, but tubers are used for planting because vegetative reproduction is the easiest method of ensuring that a variety remains true. Both home gardeners and commercial growers should use certified seed whenever it is available. These seed tubers are produced under the certification scheme, under which crops are inspected during the growing season by Department of Agriculture officers. Only tubers free from visible symptoms of virus disease are certified.

Tubers used for seed vary in size, usually from 1 to 4 oz. The quantity needed per acre is approximately 7 cwt for 1 oz tubers, 14 cwt for 2 oz tubers, and so on.

## Planting

Tubers should be planted in soil which has been thoroughly and deeply cultivated. Rows should be 28 to 30 in. apart. Tubers are planted 3 to 6 in. deep, depending on size of seed; 2 to 4 oz seed for instance should be planted 4 to 5 in. deep.

The distance between the tubers in the rows varies with size and variety from 12 to 18 in., but an average for most varieties with 2 to 4 oz seed is 15 in. Commercial crops are usually ridged at planting. This permits shallower planting with better drainage.

## Care of the Growing Crop

The soil should be kept lightly cultivated between rows to keep down weed growth and the spaces between the plants hand hoed. For weed control in commercial crops tine harrowing is begun 10 to 14 days after planting. For both commercial and home garden crops fairly frequent but shallow cultivation in dry weather will help to conserve moisture.

Home gardeners tend to mould up the rows as soon as plants are about 6 in. high. This is important for early crops where there is a danger of frost, as it gives protection until frost risk has passed. In commercial growing moulding is done in stages but must be completed before growth of plants precludes further use of implements.

After rain is the best time to mould if possible, as the soil is then in the best condition and moisture is retained. The purpose of moulding is to protect tubers against late blight and attacks by the potato moth on exposed tubers, which may also be greened if left uncovered.

Where late blight is a problem the moulding should be steep and pointed to allow maximum run-off of rain so that there is less chance of late blight spores washing down to the tubers.

## Manure

Both home gardeners and commercial growers can get detailed advice on manuring from local officers of the Department of Agriculture. In general terms, manuring can be considered for two classes of soils; medium to light soils and rich silty loams.

| | Fertiliser | Parts by Weight | Application |
|---|---|---|---|
| Medium to light soils | Sulphate of ammonia .. | 1 | 4 cwt per acre<br>or<br>1½ to 2 oz per sq. yd. |
| | Superphosphate .. .. | 3 | |
| Rich silty loams .. | Sulphate of ammonia .. | 1 | 6 cwt per acre<br>or<br>2 to 2½ oz per sq. yd. |
| | Superphosphate .. .. | 5 | |

In some areas it may be desirable to apply sulphate or muriate of potash. One part by weight can be added to either of the above mixtures.

## Diseases

### Virus

Virus infection of potato crops can be costly, as no control is possible once the plant is infected. Virus diseases of potatoes appear in many forms, some of the symptoms of infection being as follows:

**Leaf roll** causes stunting of the plant and severe inward rolling of the lower leaves, giving a spoon-shaped effect. Rolling of the upper leaves sometimes occurs because of root injury or dry conditions. The yield of severely affected plants is poor.

NUMBER 4 IN A SERIES OF LETTERS ADDRESSED TO A SHEEP FARMER'S SON IN NEW ZEALAND

# We've got the workmen in, Tony!

Your ship didn't stay long in the river after the launch. The tugs were soon busy, warping her into a fitting-out basin and now we've 'got the workmen in' with a vengeance. We launched 'Fremantle Star' as light as possible and now we must put in all the machinery, equipment and fittings that make a real, live ship out of an empty shell.

When we were working on the hull, the men in the Engine Shop on the other side of the yard were building the engines. I don't know if you've ever seen the great diesels we use nowadays, but they're nearly as big as a two-storey building. So you can see that getting *them* in is no light task.

No less important (remembering that we built the ship for the New Zealand trade) is the refrigeration plant. This was made by a specialist firm hundreds of miles from the yard and their men are busy with the installation now.

Navigational instruments, radio equipment, electrical gear, deck fittings—we're working on all of them. But such things as these come immediately to mind, when you think of fitting-out a ship. What of the hundreds of *other* things, which aren't quite so obvious? What about baths and carpets, handrails and doorknobs, bakers' ovens and butchers' blocks? They're all taken care of, Tony! Your ship is swarming with engineers and electricians and plumbers and joiners and all the other craftsmen whose work is essential to the building of a well-found ship.

But 'Fremantle Star' is something more than that. She's typical of the *modern* ships of the Lines and we've built into her several interesting features. For one thing, she has 'push-button' hatches; there won't be any man-handling of the hatch covers every time somebody has to get at the cargo. Electricity will do it for them. And, as well as the usual derricks and winches, 'Fremantle Star' has cranes, to try to make cargo-handling quicker and easier.

To tell you the truth, Tony, we're rather proud of 'Fremantle Star'. Certainly, she cost a lot of money—well over £2,000,000. Equally certainly, we can only expect from her 25 years or so of service. But she's worth it; and long before she comes to the end of her useful life, you'll probably be farming on your own. So, very likely, she'll be carrying *your* hoggets, as well as your father's. You can trust your ship, Tony . . .

## NEW ZEALAND OVERSEAS SHIPPING LINES

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**Mosaic** causes dwarfing of the plant and mottling of the leaves, the plant becomes open, and in severe cases the foliage becomes pale with wrinkled leaves reduced in size. Yield is greatly reduced.

**Crinkle** causes severe dwarfing, and leaves are crinkled, mottled, and curled downward. Loss of the bottom leaves is often accompanied by early maturity and a very low yield.

**Masked viruses:** Quite often virus diseases are masked, that is, their symptoms are not seen in the plant growth, though they reduce yields.

Virus diseases make saving of reliable seed difficult for home gardeners and commercial growers in many areas.

**Control:** (1) Use certified seed. (2) Rogue from a crop from which it is intended to save seed any plants which show peculiar growth symptoms.

### Late Blight

The late blight organism is widespread in New Zealand and during prolonged warm, humid periods the blight rapidly damages or destroys large areas.

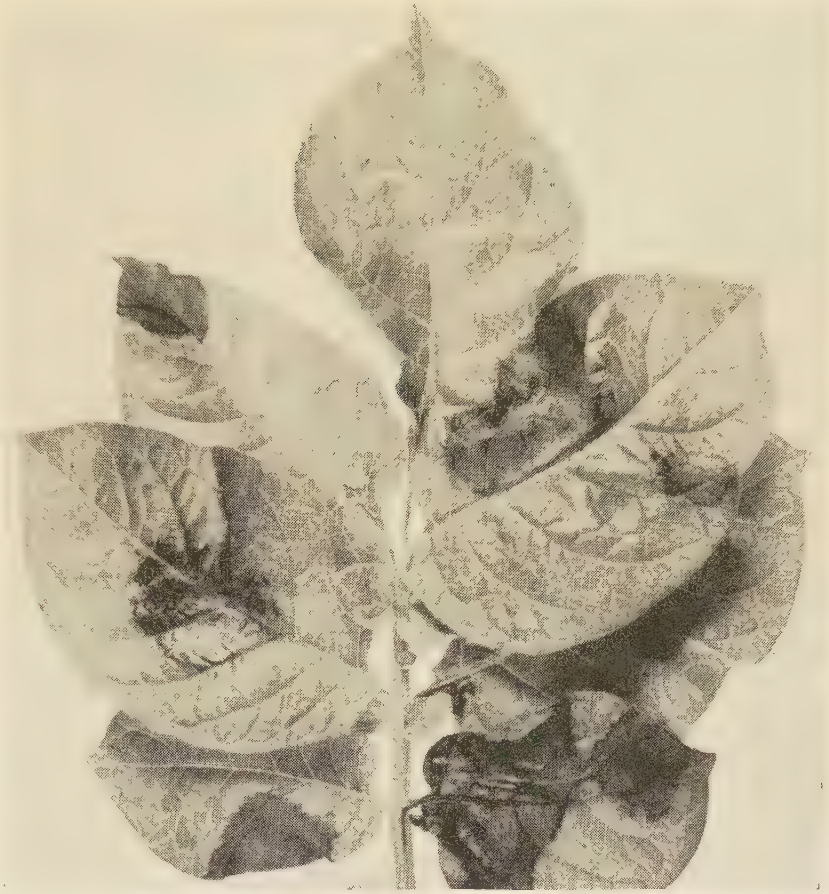
Late blight appears first as blackened patches on leaves, which become limp. The disease extends to the whole plant, with the stems blackening and collapsing. As the spores of the fungus are motile (swimming type), they can, if washed down on to the soil, infect the tubers. Good moulding gives some protection against spread of infection to the tubers.

**Control:** Late blight can be prevented by spraying regularly with bordeaux mixture or proprietary preparations containing copper oxychloride. The latter may not be quite as effective as bordeaux, but are much easier to prepare and are therefore favoured by home gardeners. Some people prefer dusting to spraying.

In districts where late blight commonly occurs it is wise to spray at 14- to 21-day intervals, depending on the weather, from an early stage of growth. If there is continued high humidity or prolonged showery weather, it may be necessary to spray more frequently; at intervals of 10 days or even seven days in extreme circumstances.

When a crop has become infected with late blight before it has been sprayed and has been considerably damaged it may be best to cut the tops off and remove them from the area. Of course this will reduce yield, but it can prevent damage to or even complete loss of tubers. Blighted tops must be removed from the area immediately or little will be accomplished.

### Ordinary and Powdery Scab



Late blight infection on potato leaf.

Ordinary scab is generally found on potatoes grown in ground very rich in humus and where liming has been heavy, whereas powdery scab occurs most frequently under cool, damp conditions. These diseases detract from the appearance of potatoes for marketing, but tubers that are severely affected with scab are usually of excellent quality when peeled and cooked.

## Pests

### Potato Tuber Moth

The potato tuber moth may attack the growing crop or lay its eggs on exposed tubers. The grubs hatching from the eggs burrow into the tubers and, apart from this immediate damage, further generations of grubs in stored potatoes can cause a line to be severely damaged. Thorough moulding of the crop is important in preventing tuber moth damage.

In districts where tuber moth damage occurs regularly crops can be sprayed with lindane. The first application should be made before the moth appears. Applications should be repeated as required.

### Looper Caterpillar

Looper caterpillar is sometimes troublesome on the tops of potatoes and can be controlled by DDT sprays.

### Wireworm

Wireworm, the larva of the click beetle, is sometimes troublesome in home garden crops. The grub, which has an elongated yellow or brown body with a hard black head, burrows into the tubers. Ground recently broken in from grass is often infested, but cultivation of the soil tends to reduce the wireworm population.

### Eelworm

Eelworm damage somewhat resembles that caused by scab, but can be distinguished by a large number of small eruptions which when cut are inclined to be watery. Crop rotation reduces the rate of infection.

## Digging

Early potatoes are dug before they are mature and the skins firm. Because of this most early potatoes are liable to be damaged unless carefully handled at all stages. This does not affect the home gardener, who usually digs a few plants at a time, but is important to the commercial grower. Early potatoes should not be dug too soon after rain, because if large amounts of soil sticking to potatoes go into the bags, the prices paid for a line at the markets will be affected.

The main crop is usually dug from the end of March onward. The crop should be fully mature before digging, as any tendency toward immaturity causes losses in storage. It is usual to delay digging until soil conditions become cooler or even light frosts occur, so that the crop will be dug in the best condition for storage.

Tubers may be left on the ground for an hour or two after digging to harden before bagging and storage. However, this practice may also expose the crop to potato moth infestation and sun scald.

### Storage

Potatoes must be stored under good conditions if losses are to be kept to a minimum. Commercial growers are tending to store in bulk in sheds with a high stud for good ventilation. There is room here for grading and bagging as required.

Any stored potatoes must be adequately protected from frost. Potatoes store best at about 50 degrees F and can tolerate a humidity range under storage conditions of between 70 and 90 per cent.

◆

## Meteorological Records for July

| Station | Height of station above M.S.L. (ft) | Air temperatures in degrees (Fahrenheit) | | | | Rainfall in inches | | | | | Bright sunshine hours |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Approx. mean | Difference from normal | Absolute maximum and minimum | | Total fall | No. of days of rain | Difference from normal | Maximum fall | | |
| | | | | Maximum | Minimum | | | | Amount | Date | |
| Kerikeri .. .. | 240 | 51.0 | + 0.5 | 65.2 | 32.9 | 8.43 | 14 | + 1.04 | 1.96 | 24 | 151 |
| Auckland .. .. | 160 | 51.8 | + 0.4 | 63.6 | 37.0 | 5.23 | 17 | — 0.23 | 1.14 | 5 | 135 |
| Tauranga .. .. | 12 | 48.2 | — 0.5 | 63.6 | 30.8 | 4.81 | 12 | — 0.23 | 1.36 | 16 | 156 |
| Ruakura .. .. | 131 | 46.4 | — 0.1 | 62.2 | 22.0 | 4.72 | 19 | — 0.01 | 1.06 | 16 | 120 |
| Whakarewarewa .. | 1,006 | 45.5 | + 1.2 | 59.9 | 26.2 | 7.61 | 12 | + 2.78 | 2.54 | 16 | 123 |
| Gisborne .. .. | 14 | 49.2 | + 1.5 | 66.4 | 31.9 | 2.27 | 17 | — 2.14 | 0.75 | 5 | 150 |
| New Plymouth .. | 160 | 49.6 | + 0.7 | 61.0 | 31.0 | 9.32 | 18 | + 2.96 | 3.08 | 4 | 135 |
| Karioi .. .. | 2,125 | 41.0 | + 0.6 | 59.9 | 22.0 | 3.42 | 18 | — 0.77 | 0.58 | 4 | |
| Napier .. .. | 5 | 48.1 | + 0.8 | 65.2 | 29.9 | 1.08 | 8 | — 2.35 | 0.34 | 25 | 141 |
| Wanganui .. .. | 72 | 47.9 | + 0.3 | 66.0 | 31.8 | 3.80 | 13 | + 0.88 | 0.85 | 5 | 102 |
| Palmerston North .. | 110 | 45.6 | — 0.5 | 63.8 | 27.8 | 3.81 | 16 | + 0.77 | 1.03 | 5 | 80 |
| Waingawa .. .. | 340 | 45.4 | + 0.9 | 63.0 | 26.3 | 4.20 | 18 | + 0.26 | 0.61 | 26 | 102 |
| Wellington .. .. | 415 | 48.0 | + 1.6 | 61.9 | 35.6 | 7.60 | 23 | + 2.24 | 1.07 | 6 | 92 |
| Nelson airfield .. | 5 | 43.6 | + 0.3 | 59.2 | 27.4 | 5.17 | 13 | + 1.94 | 1.55 | 20 | 143 |
| Blenheim .. .. | 12 | 45.8 | + 1.7 | 66.9 | 27.5 | 3.29 | 12 | + 0.68 | 1.54 | 20 | 176 |
| Hokitika .. .. | 15 | 45.7 | + 2.1 | 62.3 | 29.8 | 16.05 | 16 | + 7.55 | 3.27 | 5 | 126 |
| Hanmer Forest .. | 1,270 | 40.5 | + 2.0 | 60.5 | 17.0 | 2.20 | 15 | — 2.00 | 0.56 | 21 | 107 |
| Christchurch .. | 22 | 44.5 | + 2.2 | 64.1 | 23.3 | 1.43 | 14 | — 1.17 | 0.44 | 25 | 132 |
| Ashburton .. .. | 323 | 44.2 | + 3.1 | 65.8 | 22.2 | 1.27 | 11 | — 1.35 | 0.50 | 25 | 136 |
| Timaru .. .. | 56 | 42.7 | + 1.3 | 60.6 | 26.4 | 0.64 | 9 | — 1.09 | 0.26 | 5 | 135 |
| Alexandra .. .. | 520 | 39.4 | + 3.1 | 59.9 | 15.5 | 0.44 | 6 | — 0.22 | 0.12 | 4 | 79 |
| Taieri .. .. | 80 | 42.7 | + 1.7 | 60.3 | 23.6 | 0.89 | 10 | — 1.05 | 0.25 | 27 | 111 |
| Invercargill airfield .. | 0 | 42.6 | + 2.1 | 57.7 | 25.8 | 2.59 | 15 | — 0.22 | 0.48 | 31 | 87 |
| Chatham Islands .. | 150 | 46.8 | + 1.2 | 57.0 | 31.1 | 3.48 | 24 | — 0.10 | 0.76 | 20 | |

## Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during June 1960 and for the 11 months ended 30 June 1960 with comparative figures for the same month and for the 11 months of 1959 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

| Period | Creamery (tons) | Whey (tons) | Total (tons) | Percentage inc. or dec. |
|---|---|---|---|---|
| June 1960 .. .. .. .. .. .. | 300 | 15 | 315 | — |
| June 1959 .. .. .. .. .. .. | 907 | 14 | 921 | — |
| Increase or decrease .. .. .. | —607 | +1 | —606 | —65.798 |
| 11 months ended 30/6/60 .. .. | 158,690 | 2,977 | 161,667 | — |
| 11 months ended 30/6/59 .. .. | 175,592 | 2,714 | 178,306 | — |
| Increase or decrease .. .. .. | —16,902 | +263 | —16,639 | —9.332 |

Butter in store at 30 June 1960 was 15,843 tons

CHEESE

| Period | White (tons) | Coloured (tons) | Total (tons) | Percentage inc. or dec. |
|---|---|---|---|---|
| June 1960 .. .. .. .. .. .. | 703 | — | 703 | — |
| June 1959 .. .. .. .. .. .. | 812 | — | 812 | — |
| Decrease .. .. .. .. .. .. | —109 | — | —109 | —13.423 |
| 11 months ended 30/6/60 .. .. | 75,766 | 11,316 | 87,082 | — |
| 11 months ended 30/6/59 .. .. | 66,423 | 13,429 | 79,852 | — |
| Increase or decrease .. .. .. | +9,343 | —2,113 | +7,230 | +9.054 |

Cheese in store at 30 June 1960 was 11,525 tons

If these figures are converted into butterfat equivalent, there is a decrease of 6.244 per cent in butterfat graded for the 11 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export and do not include butter and cheese which is used on the local market and products such as anhydrous milk fat, whole milk powder, and other whole milk products, and are not necessarily a true indication of production trends.

## Controlling Springtails on Crops

SPRINGTAILS are minute (up to the size of a pinhead), soft bodied, wingless springing insects which eat the seed leaves and growing points of plants before and just as the true leaves begin to appear. They vary from yellow to dark blue, and their colour and smallness make them hard to see on cultivated ground, where they may be causing serious damage though they are unseen. They live mainly on decaying vegetation and can be found on pastures, where they normally do very little damage.

On spring-sown crops of turnips or chou moellier hordes of springtails often attack the germinating plants and decapitate them before they break through the surface. The odd plants that do manage to survive to the first two-leaf stage have pieces chewed out of their leaves rather like the ear-marks of sheep.

Springtail infestations are best identified by placing a piece of white notepaper on the ground and then gently brushing a hand toward the paper. If the infestation is serious, numerous springtails will be observed landing on the paper and control of them will be imperative if the succeeding crop is to survive. The crop should be sown and then the ground sprayed with a suitable insecticide within two days of sowing. If spraying is left any longer, the springtails may eat the germinating shoots even before they are through.

Fifty per cent malathion at 1½ pints per acre gives effective control, as does ½ lb per acre of lindane. One spraying with any of these materials controls springtails for two to three weeks by which time the crop has reached the four- to six-leaf stage and is usually strong enough to repel any further attacks.

—*D. L. JANETT,*
*Farm Advisory Officer,*
*Department of Agriculture,*
*Pukekohe*

◆

# Book Reviews

## "Principles for British Agricultural Policy"

THIS book has been a long time in the making. It was sponsored by the Nuffield Foundation in 1945, but for various reasons publication has been delayed until this year. The book is the work of a committee, though careful editing gives a continuity of style and presentation. Apparently the various sections were prepared by experts in the particular fields and then discussed by the committee. The foreword emphasises that the aim has been to establish principles on which long-term policy might be based—not policy itself, which is the responsibility of Government. To this end there are sections covering the history of British agriculture, technical aspects, strategic considerations, and finally the economic aspect.

Inevitably it has not been too easy to separate principles from policy and in view of the fact that the committee of six included the president, vice-president, and general secretary of the National Farmers' Union it is not perhaps surprising that at times the principles appear to have been influenced by policy!

The book is at its best in its history and description of British farming. The chapter on strategic considerations shows strongly the influence of the war and immediate post-war years and the last section covering future food requirements and possible increases in world food production, which one might have imagined would be of considerable importance in policy making, is compressed into a few pages. In the summing up the authors come to the conclusion that the principle of permanently maintaining British agriculture at a level higher than is economically justifiable rests largely on the strategic argument. This is now almost certainly outdated and there are, in fact, probably stronger grounds, even if controversial ones, on the economic and social sides in favour of something like present British agricultural policy.

The book is well written and very readable. A minor complaint is the inadequate indexing. There are numerous references to Australia and New Zealand, but neither country is considered worthy of a place in the index, being less fortunate in this respect than the U.S., the U.S.S.R., and Switzerland. Incidentally the members of the committee should have been aware that New Zealand soils are not naturally particularly favourable to pasture production.

The composition of the committee and the conclusions reached suggest that at times "must have been some animated discussion and some difficulty in reaching an agreed draft. The moral for New Zealand is that the protection of U.K. agriculture will almost certainly continue. Thus this book besides being valuable for reference on technical matters is worthy of study by all serious students of agricultural economics not only in New Zealand but in other countries supplying agricultural products to the U.K. market.

*—J.V.W.*

**Oxford University Press. 18s. net in U.K.**

## "Principles and Methods of Animal Breeding": R. B. Kelley

IN recent years several revised editions of older books on animal breeding have appeared of which Dr Kelley's is the latest. As in the two earlier editions it is aimed mainly at breeders of livestock, with students forming a second intended audience.

Dr Kelley is a man of much experience in the livestock world and his book bears ample testimony to this. His knowledge and obvious love of the history of animal breeding form a basis of several introductory chapters. Unfortunately, however, the subsequent chapters cannot be recommended. They do Dr Kelley little credit either as a geneticist or as an essayist.

From a genetic viewpoint the book is unsatisfactory. Many basic concepts in animal breeding are omitted; genetic correlations receive no mention; heritability estimates, their derivation, and meaning are barely discussed, and the subject of the nature and origin of variation is inadequately covered. In sentence structure and phrasing the text needs the attention of a competent editor; for instance, Dr Kelley describes proven sires as "proven-for-daughters-production pedigree bulls". When such phrasing is confounded by obscure genetics the result is alarming. Thus on page 127 a paragraph reads, "When for a more complex genetic situation in a random breeding flock or herd the value $1-q$ is equal to that of $q$, the number corresponding to the second power used for expansion of the binomial in the simple situation will then be large". Unfortunately such examples as the two quoted are common and make reading a cumbersome exercise.

For the student the book is insufficient in its coverage of animal breeding and is far too imprecise in the discussion of basic genetics. For the breeder it is likely to prove difficult to read and to comprehend. Apart then from the interesting introductory chapters the book cannot be recommended.

*—C.P.McM.*

**Angus and Robertson Ltd. 48s.**

## "Odhams Fruit Growers Encyclopaedia": Edward Hyams

THIS book by a British fruitgrower is prepared in the form of an alphabetical encyclopaedia on all aspects of fruitgrowing. It is a comprehensive publication written for the grower in Britain and has some excellent photographs of a number of pests and diseases.

Much of the information, however, does not apply to New Zealand and is of little value to growers here. It may be of interest to the amateur horticulturist because of its general coverage and manner of presentation.

*—R.G.H.*

**Odhams Press Ltd. 30s.**

## "Native and Adapted Cattle": R. B. Kelley

THIS book will be read with absorbing interest by the keen cattleman, though its direct applications to cattle production in New Zealand are limited.

Dr Kelley has spent a lifetime studying the cattle breeds of the world. Many of these are strange to New Zealanders, who have been associated with stock of British origin only. Yet far more of the world's cattle have their ancestry in the East and in the hot and dry areas of the world than in the British islands.

Dr Kelley is famous in his own country for the advocacy of cattle of Asiatic origin for the more difficult parts of Australia.

This book should occupy a place on the shelf of every progressive cattle breeder.

*—C.P.McM.*

**Angus and Robertson Ltd. 50s.**

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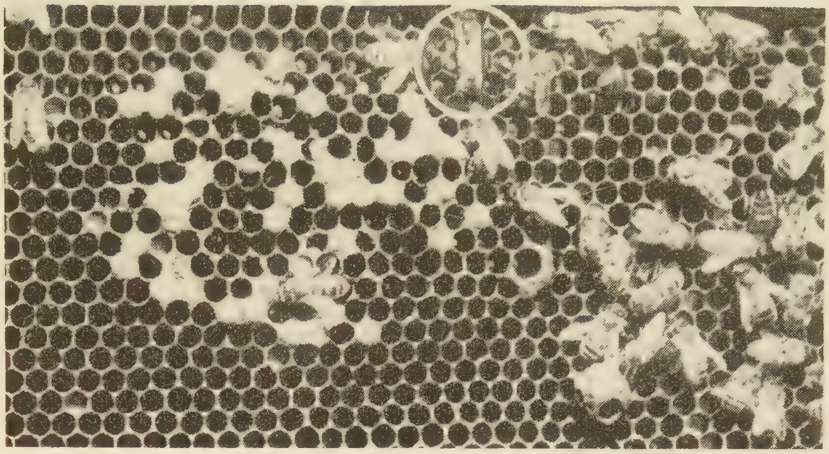
# Spring Work in the Apiary

## Seasonal Notes for the Domestic Beekeeper

By R. H. HOBBS,
Apiary Instructor,
Department of Agriculture,
Greymouth



Part of a bee comb showing irregularly spaced drone brood produced from the eggs of an unmated drone-laying queen (in circle).

**WITH the advent of longer days, warmer temperatures, and increased hive activity, the beekeeper should plan his programme for the coming season.**

ALL hives should be examined as early as possible during spring for food supplies, laying queens, and disease. For this early inspection, hives should be opened on a warm, sunny day, preferably about midday, when the temperature is warmest.

The main items of equipment for working with bees are a wire veil, gloves, light-coloured combination overalls, hive tool, and smoker. When properly equipped, beekeepers can work efficiently and with freedom from stinging.

Hives should not be opened during cold windy weather, early in the morning, or late in the evening if it can be avoided, as bees that fly from the hive may become chilled and, being unable to return to the hive, die of exposure. Bees also resent being handled if the weather is adverse and the beekeeper is apt to get a severe stinging unless he is wearing proper protective clothing. Once bees become roused and start stinging they often follow the beekeeper from hive to hive. These bees cause others within opened hives to become infuriated and this can make handling of bees very unpleasant.

Beekeepers who have colonies in cities, towns, or urban localities should take special care to avoid unduly arousing their bees, as they are likely to cause trouble by stinging neighbours or their animals.

### Good Equipment Essential

Good equipment for working with bees as illustrated on this page is essential. Main items are a bee smoker, a bee veil, a hive tool, light-coloured combination overalls, preferably with a zip fastener down the front, and a pair of leather gloves. The smoker should be capable of giving off a large volume of cool, white smoke. A good smoker used judiciously will control the bees at all times. The main types of fuel used in the smoker are sacking, pine needles, and wood shavings.

When a hive is opened the lid should be placed upside down in front of the hive and the supers placed on it as the hive is pulled down to avoid honey being spilt on the ground or the queen getting lost. For the first inspection the hive should be checked over for a laying queen, disease, and the amount of stores. It should then be reassembled. Hives should not be left open longer than necessary, as the brood may become chilled or bees from another hive may start robbing.

### Defective Queens and Queenless Hives

Colonies at this time of the year should have two or three well filled combs of brood in the centre of the brood nest. If there is very little or no brood, the queen should be checked for age or deformities which may prevent her from laying to the capacity of the hive. All queens that are past their prime or are defective should be replaced as soon as possible by young, vigorous, well bred queens either raised by the beekeeper or obtained from some reliable commercial breeder. Hives may be found to be queenless or with drone-laying queens and occasionally laying workers.

Drone laying may be caused by an old queen failing; or by a young queen failing to mate because of bad weather, being raised too late in autumn for mating; or being unsuccessfully mated. The eggs laid by a drone layer are irregularly placed in the brood nest and the brood is sealed with high, bullet-shaped cappings (see illustration above).

In a hive where a drone-laying queen is present the queen should be killed and all the brood removed and replaced with other combs of worker brood with adhering nurse bees from queen-right colonies. The following day a queen cell or a caged queen may be introduced, or, after the queen has been killed, the hive can be united with a queen-right colony.

Laying workers are usually found in a colony that has been unable to

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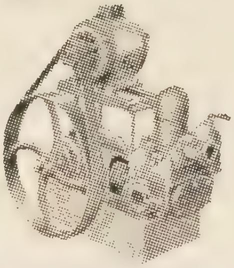

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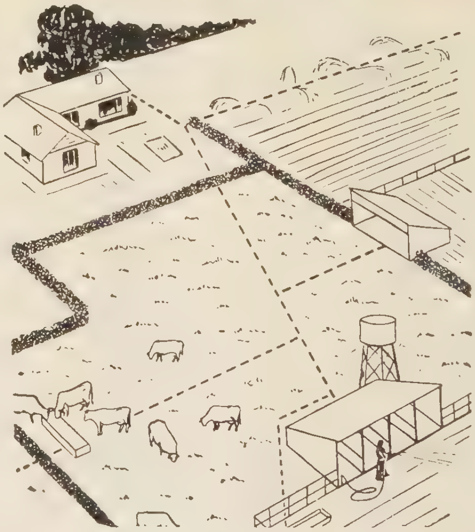

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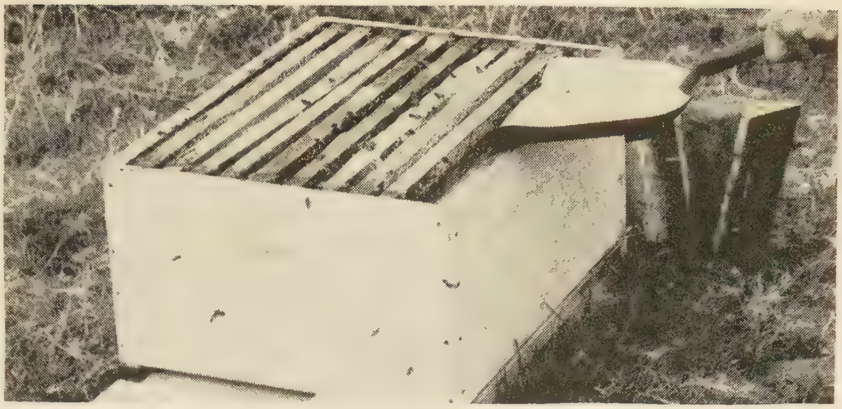

With the removal of an outside comb from the brood nest and the entrance on that side of the hive partly closed, space is made into which dry sugar can readily be poured with a fire shovel or large scoop.

raise a queen and has been queenless for a long time. Ordinary worker bees are females, but are physically unable to mate and any eggs they lay must be unfertile and hatch out into drones which are smaller than those produced by a drone-laying queen. Laying workers lay their eggs on the sides of the cells, usually several in each cell. Colonies in which there are laying workers are usually very weak and consist mainly of old bees. It is almost impossible to do anything with such colonies and they are better destroyed.

Queenless colonies that have become weak are best united with queen-right colonies. Others can be given combs of brood with adhering bees from stronger hives and next day given a ripe queen cell. Colonies that have been queenless for a long time will accept only queen cells or a virgin queen and will almost invariably destroy laying queens unless they are given brood and nurse bees before a laying queen is introduced.

During early-spring inspection all colonies should be checked for the presence of American foul brood disease (*Bacillus larvae*). Any colony that has been robbed or has died out during winter or early spring should be thoroughly examined and if this disease is found, the hives should be destroyed immediately by burning and the local Apiary Instructor of the Department of Agriculture notified within seven days.

Failure to detect the presence of this disease in hives in autumn, when the hives are closed down for winter, usually results in affected hives being robbed out in early spring by other colonies. In this manner the disease is spread to other hives and apiaries, and for this reason the importance of an early-spring inspection cannot be over-emphasised.

## Supplementary Feeding

In most districts the food reserves in each colony should be not less than 25 to 30 lb of honey and at least the equivalent of one full comb of pollen. Where stores are short supplementary feeding should be carried out.

The amount of supplementary feeding will vary in each district according to the nectar sources available and also the effect of local climate on their yields. Where combs of honey are saved from the previous season adjustments to colony stores can be easily made, but if the supply of these combs is limited, it is advisable to feed the combs of honey to the weaker colonies and to feed stronger colonies with sugar syrup or dry sugar.

Sugar syrup can be made by mixing equal quantities of A1 grade white sugar and warm water and by stirring until all the sugar is completely dissolved. Syrup may be fed in division board feeders or in tins with perforated lids. The tins are inverted and placed within the hive as close to the bee cluster as possible. Feeding should be done toward evening, as this reduces the tendency of the bees to rob.

### Use of Dry Sugar

Dry sugar is being used by a large number of beekeepers because it is the easiest, quickest, and simplest method of feeding sugar. It does not excite the bees and start them robbing, so that it can be fed at any time during the day; nor does it stimulate the hive and cause excessive brood rearing as feeding of syrup may. It should not be fed to hives during excessively cold weather, as the bees may not leave the cluster and work on the dry sugar or be able to leave the hive to obtain the moisture needed to convert the sugar into syrup for storage in the combs.

The easiest and simplest method of feeding dry sugar is to place the sugar on top of the combs toward the back of the hive. It will fall down between the combs on to the bottom board, from where the bees will take it up and convert it into syrup as required. Other methods are to place the sugar on top of an inner cover with a hole in the middle directly above the brood nest, which allows the bees access to the sugar, or to remove a comb from the outside of the brood nest and partly close the entrance on that side of the hive; the sugar is then poured with a fire shovel or large scoop into the cavity thus made.

After dry sugar has been fed, worker bees will be observed carrying grains of sugar out of the hive and dropping them a foot or two away from the entrance. This is more noticeable in hives that have been fed the dry sugar on top of the combs and is caused by the bees cleaning the sugar grains out of the cells of the combs. However, when these hives are opened and inspected they will be found in as good condition and as well supplied with stores as hives fed by different methods.

---

# Efficient Mole Drainage

THE amount of water in the soil at time of moling has an important influence on the efficiency and life of mole drains and should be the major consideration in determining when this work is done.

Examination of moles pulled when the soil is wet will generally show that channels have become completely or partially blocked with slurry and though they may carry some water, their region of influence is very narrow. Strips of green 18 in. wide in an otherwise unthrifty pasture indicated in one case the limited benefit derived from moles pulled when the soil was too wet. The absence of shattering in the clay subsoil when moles are pulled in wet soils has been suggested as being responsible for this strip effect.

A discharge from outlets immediately moles are pulled indicates that conditions are too wet and the system is unlikely to be effective.

Heavy rains after moling, particularly on a soil already wet, have sometimes proved detrimental to the system. Moling should be done when the clay is reasonably dry, just wet enough to be plastic, and when there are reasonable prospects of dry weather.

—*J. F. SCOTT,*
*Farm Advisory Officer,*
*Department of Agriculture,*
*Christchurch*

# Care of Livestock during October

By the Animal Research Division

### CATTLE TICK CONTROL

WHERE cattle ticks are plentiful, spraying or dipping should be done in November and December to prevent tick worry and kill the adult female ticks before they lay their eggs.

### BLOWFLY STRIKE IN EWES

In districts where crutch strike causes trouble in ewes crutching or early shearing is advised. Close supervision is necessary to detect cases so that suitable treatment can be applied before the strike becomes too extensive. When treating cases of fly strike shear the soiled wool away from the immediate vicinity of the strike. Dressings containing aldrin, diazinon, or BHC will rapidly kill the maggots, which will be expelled from the wound. In addition treatment with aldrin or diazinon preparations will prevent restrike until dipping, if this is done in January. These dressings do not prevent the flies blowing the sheep with eggs, but they do prevent the maggots from hatching and causing a strike.

Irritant fluids such as kerosene should not be used; they may kill the maggots, but they will irritate the wound and tend to cause restrike.

Jetting ewes is not usually necessary, but if fly strike is severe, it may be advisable to treat them to give protection until dipping. Apply ½ gallon of aldrin or diazinon wash to the crutch of each animal, extending the wetted area to above and round the tail. A pump working at 40 to 60 lb pressure per square inch, with a hand cut-out on the nozzle, is advisable for this purpose.

### BLACK DISEASE VACCINATION

In east coast areas of the North Island where black disease of sheep occurs vaccination should be carried out during November or early December. This will protect against the disease, which occurs mainly in summer and autumn. Vaccine should be ordered immediately.

### BLOOD POISONING AFTER SHEARING

Deaths after shearing may be due to infection of cuts or bruises with the blackleg germ. This disease can be prevented by vaccinating at least three weeks before shearing. Sheep which have been vaccinated previously may not require revaccination, and a veterinarian or Livestock Instructor should be consulted about the best procedure.

### BLACKHEAD IN POULTRY

Until recently blackhead was looked on as essentially a disease of young growing turkeys. It used to cause heavy losses, as there was no efficient method of control, but today drugs are available which can control it effectively. Both entramin and nithiazide have proved effective in controlling blackhead in turkeys.

This disease is now proving troublesome in chickens, but drugs can also be used effectively with them. Those which have proved satisfactory are entramin A and nithiazide. Entramin should not be used with chickens, as it has an adverse effect on the sexual maturity when pullets are expected to come into production. In the event of outbreaks producers should consult their local Poultry Instructors if they cannot obtain supplies of the drugs mentioned.

### MATING OF DAIRY COWS

Before each cow is mated two heat periods or an interval of at least 30 days should be allowed after calving. Cows mated before this period are less likely to get in calf, and the chances of contaminating the bull are increased. Hand-mating should be practised and accurate records kept showing the bull used and dates of all services. If breeding trouble occurs, these records will be of considerable assistance in arriving at a correct diagnosis.

### COCCIDIOSIS IN CALVES

Scouring in calves under six months of age is seldom due to worms; it is much more likely to be due to coccidiosis, especially if blood is present in the droppings. Effective drugs are available for treatment, but these can be obtained only on the prescription of a veterinary surgeon, who should be consulted.

### ARSENIC POISONING

Most deaths in cattle, sheep, and dogs from arsenic poisoning are caused by their drinking from foot rot baths containing arsenic. If arsenic is used, baths should be fenced off from stock and also made inaccessible to dogs, which are prone to drink from them when they are round the sheep yards. Cases occur throughout the year, but the greatest number occur in November.

### SUPPLEMENTARY FEED

Supplementary feed is essential to ensure the proper feeding of cows in winter and in dry summers and to control facial eczema in autumn. As soon as more pasture is available than is necessary to meet the immediate needs of stock the balance should be shut up for silage or hay. On a well managed dairy farm it should be possible to shut up at least 40 per cent of the pasture. Crop growing for fattening of weaned lambs is standard practice in South Island districts and it could with advantage be adopted more widely in North Island districts which have a dry summer. Crops such as thousand-headed kale, chou moellier, and turnips, in addition to providing excellent fattening feed for lambs, are a splendid insurance against facial eczema. In Poverty Bay and Hawke's Bay they should be sown before the end of October so that they can be well established before dry weather sets in.

### EARLY WEANING OF LAMBS

Where early weaning of lambs is practised on hill country, suitable areas should be spelled early this month for weaned lambs.

### EARLY WEANING OF CALVES

If dairy calves are to be early weaned, July-born calves should be weaned. Jersey calves should attain 120 lb liveweight (equivalent to 33½ in. chest girth) before being weaned on to rotationally grazed pastures.

# Seasonal Notes

By Farm Advisory Division

## POTASH DEFICIENCY SYMPTOMS

INTENSIVE farming may have caused potash deficiency in your pastures and that may be why some of them are not responding to the warmth of spring. The slowest paddocks are often those which have been cut for many years for hay or silage or are so far from the milking shed that they are used only for the day-time grazing of the herd. Perhaps some of the paddocks have never really recovered from the effects of intensive cropping in the early days of farming, or perhaps on the lighter soils grass grub is blamed for the weakened pastures and the possibility that the soil has become infertile is overlooked. These are the paddocks to watch for potash deficiency, particularly if their response to phosphatic fertilisers is becoming weaker.

A warning sign is patchy growth, with weakened grass and spindly clover struggling between tufts of strong-growing pasture where urine has been voided earlier in the season. These tufts are smaller and closer together on the sheep farm, so there is less contrast in a potash-deficient sheep-grazed paddock than in a similar dairy pasture.

Clover often grows well in these tufts, but severely potash-starved white clover often shows some leaves which have creamy spots and sometimes marginal scorching. In red clover the leaves may show brown spots and later scorching at the edges.

A few minutes spent searching your pastures for this pattern of potash starvation could lead you to adopt a more balanced topdressing programme and so increase the production and profit from your farm.

—*R. G. WARREN, Dannevirke*

* * *

## FODDER BEET

WHERE diseases and insect pests have made the growing of swedes, turnips, and chou moellier difficult fodder beet may be grown in their place on heavier soils and also on light soils in districts which have a good summer rainfall.

Where required for winter feeding fodder beet should be sown in early October in rows 24 to 28 in. apart on either a flat or ridged seedbed at 3 to 5 lb per acre, but this may be reduced to 2 lb per acre if "rubbed" seed is used.

Fodder beet should be fertilised with superphosphate 5 to 7 cwt per acre, borax 10 to 15 lb per acre, and, where required, muriate of potash 1 to 2 cwt per acre. The initial growth of fodder beet is slow and the rows of seedlings should be intercultivated to keep the crop free from weeds. When seedlings are big enough the crop should be thinned, leaving single plants at 9 to 12 in. spacings. Rows should be further intercultivated if necessary to control growth of weeds.

Fodder beet can be fed off at any stage of growth to sheep, pigs, and cattle, though cattle should not be allowed to gorge themselves on this crop.

—*R. C. STEPHEN, Balclutha*

## CHEMICAL WEED CONTROL IN CEREALS

WITH autumn-sown cereals on heavy land or cereals sown in spring the weed problem is often acute and hormone weedicide spraying is necessary for effective weed control. These are very effective against both annual weeds and Californian thistle. Salts of MCPA or amines of 2,4-D applied at 1 lb acid equivalent per acre give the best results. Other hormone weedkillers such as the esters of 2,4-D can cause crop damage. Where clover is undersown and chemical weed control is necessary the crop should be treated with 2,4-DB at 1 lb acid equivalent per acre or MCPB at the same rate for white and red clover undersowing respectively. Both clovers should have reached the true leaf stage before spraying is attempted.

Care must be taken to select the right stage of crop growth for spraying. In cereals the plants should have completed tillering and be 6 to 8 in. high. Spraying earlier can reduce both tillering and crop yields. A more satisfactory kill of weeds is usually obtained when crops are sprayed soon after tillering is completed. The crop is then not as growthy as it is later, and weeds are not sheltered from the weedicide treatment by the taller crop plants. However, a compromise between stage of growth of the crop and maximum germination of the weeds frequently has to be made, as sometimes the best stages for both crop and weed spraying do not coincide.

Though cereals in ear can be sprayed with weedkillers, hormones applied at this stage of growth can cause tainting in wheat, reduced malting quality in barley, and poorer germination in all cereals saved for seed.

—*C. C. McLEOD, Timaru*

* * *

## ROTARY CUTTERS AND WEED CONTROL

THOUGH good work has been done with hormone weedicides in the control of weeds on newly developed country, the use of these is costly and frequently results in considerable pasture damage. The use of the rotary cutter for control of weeds on country that is safe for a wheel tractor thus has several distinct advantages. It is cheap, does not damage associated pasture species, and is much quicker. The most popular type of cutter in Tauranga County is one with solid cutting bars rather than chain-cutters. The machine has been used with success in the control of various weeds including gorse, manuka, broom, lupin, and rushes.

The cutter severs the weeds at ground level, the stumps that are left being lacerated and shredded. In grassed country heavily infested with weeds the land is opened up for stock, which can graze pasture not otherwise accessible to them. Some weeds are killed with one cut, but others require several cuttings and some may survive even this treatment. Even so, at a cost ranging from 15s. to 25s. per acre per cut, depending on weed density and contour of country, the cost of weed control with the cutter compares more than favourably with the cost of spraying for scrub weed control.

—*A. V. ALLO, Tauranga*

# Butterfat per Acre

# A Summing Up of Research

THE article below by Dr J. F. Filmer, first Director of the Animal Research Division of the Department of Agriculture, who is to retire toward the end of this year, discusses major aspects of animal husbandry that have had light thrown on them by animal research workers in recent years. Dr Filmer emphasises that any conclusions and recommendations are his own, but that credit for the results on which he has drawn for his summing up must belong to the workers who got them and have approved them as he has presented them.

LAST year at one of the Ruakura dairies **a herd of 40 cows produced 476 lb of butterfat per acre.**

The average production for the Waipa County, in which Ruakura is situated, is approximately **240 lb of butterfat per acre.**

**What are the factors which account for this very large difference?**

THE first factor is the different basis on which the figures are calculated. The county average gives the production per acre for the area used for dairying and carrying bulls, dry cows, and replacement young stock as well as milking cows. The Ruakura figure gives the production per acre of grass actually grazed by milking cows only. When allowances are made for these differences the Ruakura figure should probably be reduced to approximately 376 lb of butterfat per acre.

## Effect of Dry Stock

The very significant effect of dry stock on butterfat per acre is probably not appreciated by dairy farmers.

A bull probably eats about as much grass as a milking cow. If a farmer carrying 100 milking cows, 18 yearling heifers, and four bulls goes over to artificial breeding and keeps only one bull for his yearlings, he can probably carry three additional cows, and if these average 300 lb of butterfat at 3s. per pound, the increase in financial return would be £135, which can be offset against the cost of artificial breeding.

The pasture consumed by each heifer before it begins to produce is approximately that consumed in a year by a milking cow. On this basis it can be calculated that if butterfat is worth 3s. per pound, a dairy farmer can afford to pay up to £45 for a down-calving cow which will produce 300 lb of butterfat per year. Similarly, if whole milk is being sold for 28.8d. per gallon, a town milk supplier can afford to pay up to £72 for a down-calving cow which will produce 600 gallons per annum.

The difficulty of buying good replacements and the risk of introducing disease may well be adequate reasons for factory suppliers at least to continue to breed their own replacements. They should, however, realise the importance of getting them down to a minimum by attending to the health of their cows and thus prolonging their lives.

Cows on the uncontrolled grazed heavy stocked area at Ruakura's No. 2 Dairy.

Cows controlled grazed on the heavy stocked area at Ruakura's No. 2 Dairy.

If the average number of lactations per cow can be raised from five to six, this would result in an increase in production per acre of about 3 per cent. This may not appear spectacular, but on a 100-acre farm at present producing 240 lb of butterfat per acre at 3s. per pound it would be worth £108, which is a great deal more than the cost of veterinary services to the average dairy farmer. On a national basis it would be worth approximately £2,300,000. The income tax derived from this would be more than enough to pay for all the animal research being conducted in New Zealand.

Even after allowing for dry stock the Ruakura production is **still about 57 per cent above the Waipa County average and it is important to determine what dairy farmers can do to raise their production to the level achieved by Ruakura and other efficient dairy farmers.**

## CONVERTING GRASS TO MILK

The essence of dairy farming in New Zealand is the conversion of grass to milk. This process involves three biological components: grass, cows, and dairy farmers; and the quantity and quality of each of these make significant contributions to the level of butterfat production per acre.

It is obvious that quantity and quality of pasture are the foundation on which high production must be built.

In terms of pasture species and strains Ruakura pastures are no better than average and it could well be that by using better strains production could be lifted still further.

Fertilisers can have a marked effect on pasture growth. At Ruakura topdressing has been conservative and has been restricted to the application of 2 cwt of superphosphate per acre.

### Pasture Growth

One of the most important factors in the production of butterfat in New Zealand is the great variation which takes place in pasture growth within each year and, to a less extent, between years.

Rate of pasture growth in late spring may be twice as great as it is in autumn, three times as great as it is in late summer, and 10 times as great as it is in winter.

Pasture production in a very good year may be 50 per cent higher than in a very bad year.

While the dairy farmer cannot influence the seasonal and interseasonal variations in climate he can do something to modify their effects on pasture growth. The length of pasture influences soil moisture, soil temperature, and the amount of light available to the various pasture species. These interactions are not simple ones, but in general it can be said that pasture which is grazed at about the 4 to 6 in. level and is not grazed hard during summer will give reasonably good growth throughout the year.

Fortunately pasture treated in this way also provides feed which is very well suited to the requirements of grazing dairy cows.

However, even with the best pasture management there is still a very large difference between pasture growth at different seasons.

By calving early in the spring it is possible to arrange for the maximum requirements of the dairy herd to coincide with the period of maximum pasture production.

The requirements of the milking herd increase sharply from the beginning of calving, and in the Waikato reach a peak about the end of December, after which they decline slowly.

### Pasture Conservation

To balance the herd requirements with pasture growth it is necessary to supplement pasture during late summer, winter, and early spring. This may be done by purchasing concentrates and hay. Work at Ruakura has shown that the purchase of concentrates is seldom profitable. While the purchase of hay may be sound practice in some circumstances, in general the only alternative is to conserve pasture by cutting for silage and hay in summer and by shutting up pasture in autumn.

It is well recognised that heavy losses of digestible nutriments occur during the making of hay and silage. However, under New Zealand conditions these are the only economic processes available for making spring surpluses available for supplementing winter and late summer shortages.

Obviously the amount of pasture which can be conserved will depend on the stocking rate, for example, if the herd is large enough to consume all the pasture available during the

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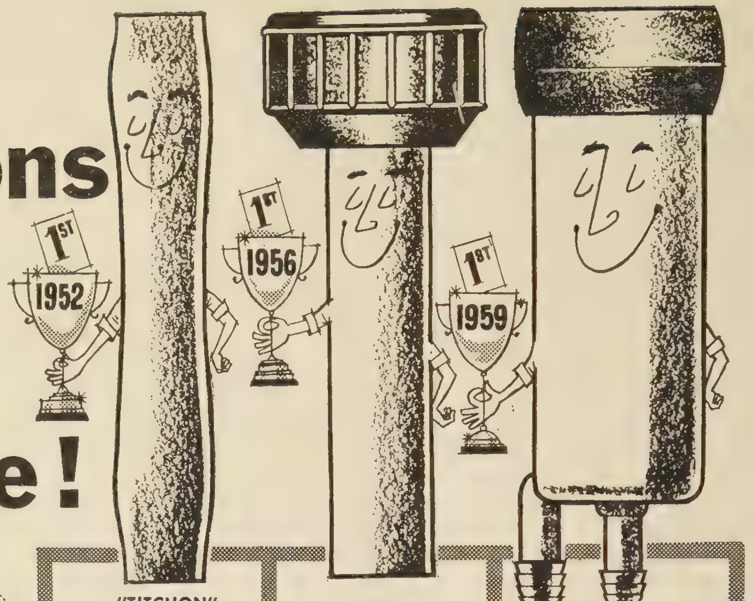

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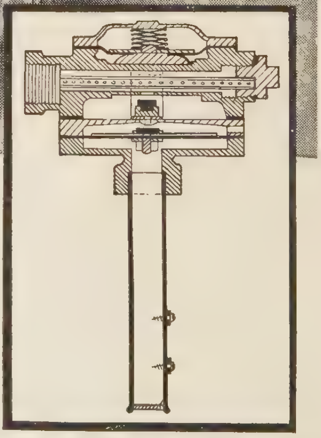

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▲ Dry stock have a very significant effect on butterfat per acre. However, the difficulty of buying good replacements and the risk of introducing disease may well be adequate reasons for factory suppliers at least to continue to breed their own replacements, though by attention to the health of their herds they should try to keep replacements to a minimum.

period of maximum pasture growth no conservation will be possible. If the herd can consume only half the pasture available during this period the other half can be cut for silage and hay, and by feeding silage during late summer it will be possible to shut up approximately half the pasture during autumn.

The amount of pasture conserved should be adequate to feed the herd during late summer, winter, and early spring and to leave a surplus at the end of winter to ensure that adequate supplies will be available if the following year is a bad one for pasture growth. This amount should be approximately the average requirements for one year. This may seem unnecessarily high, but it is wise to remember that in a bad year the demand on silage and hay is abnormally high and surplus pasture available for conservation is abnormally low.

If there is not an adequate reserve available, hay or concentrates will have to be bought at famine prices or stock will have to be sold on a glutted market.

Growth, management, and conservation of pasture are obviously very important on the dairy farm, but maximum production per acre will not be achieved unless this fodder is consumed by a suitable number of well managed, good-quality dairy cows.

## Conversion Efficiency

Ruakura work has shown that a high-producing cow is very much more efficient in converting pasture to butterfat than a low producer of the same weight. It has been calculated that if a herd of 100 milking cows and dry stock with an average production of 200 lb of butterfat is replaced by a a herd in which cows average 400 lb of butterfat, about 83 cows plus dry stock can be carried. The resulting increase in butterfat produced would be approximately 60 per cent. Such a spectacular increase would take many years to achieve by breeding, but breeding is not the only way in which production per cow can be increased.

In a recent experiment at Ruakura it has been shown that the production of heifers can be lifted from 220 lb to 330 lb of butterfat by an overall improvement in methods of management. Other experiments have shown the specific effects of improved feeding and management at different stages in the life of a dairy cow.

## Good Rearing Important

Good calf rearing is important for two reasons. If calves are not reared properly, there will be a high death rate, and this means that more replacements will need to be kept and they will eat pasture which could be converted into butterfat by milking cows. At Ruakura it has been shown that a well reared heifer will outproduce a poorly reared one in its first lactation by 21 lb of butterfat when both are well fed after calving. The difference increases to 51 lb of butterfat if the poorly reared heifer is not well managed during lactation.

## Feeding Before Calving

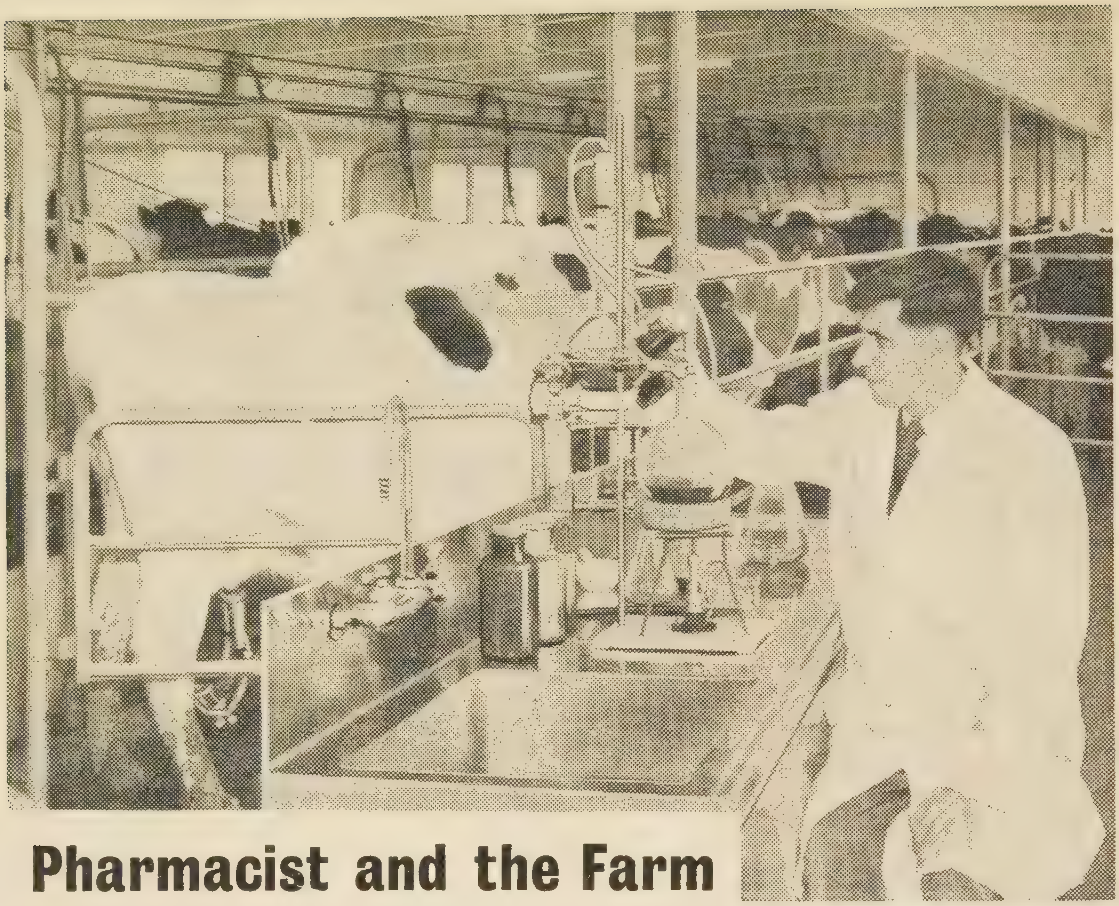
Good feeding during the three months before calving is very important. It is impossible for a high-producing cow to eat enough pasture to maintain its weight during the early part of lactation. This means that it must draw on its body reserves during this period. If it has calved in good condition, this is not important. On the other hand if it has calved in poor condition, not only will production suffer during early lactation, but there will also be a delayed effect. In a three-year experiment at Ruakura the average difference in production between well and poorly wintered cows was 50 lb of butterfat when all cows were well fed after calving.

## Feeding After Calving

Though it is impossible for a high-producing cow to eat enough during the early part of lactation to maintain its weight, it is important to make sure that it receives the best pasture available at this time.

In two experiments at Ruakura it was shown that the production of cows could be increased materially when they were fed a small supplement of concentrates in the first eight weeks after calving, during which time they were fed on inadequate pasture. Of even greater importance was the carry-over effect, when all groups were transferred to good pasture at the end of eight weeks. In one experiment the increase in butterfat for the first eight weeks was 18 lb, which increased to 79 lb for the whole lactation.

It should not be assumed that concentrates must be fed, but rather that care should be taken to ensure that adequate pasture is available for newly calved cows.



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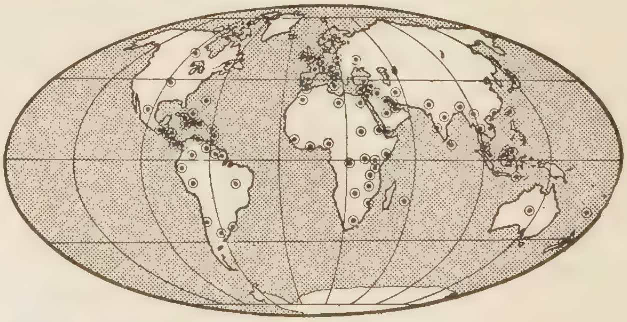

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| Year | | Controlled | | Uncontrolled | |
|---|---|---|---|---|---|
| | | per cow | per acre | per cow | per acre |
| 1946-47 | .. | 289 | — | 242 | — |
| 1947-48 | .. | 301 | 210 | 255 | 182 |
| 1948-49 | .. | 340 | 259 | 256 | 195 |
| 1949-50 | .. | 317 | 257 | 313 | 248 |
| 1950-51 | .. | 356 | 271 | 295 | 230 |
| 1951-52 | .. | 294 | 238 | 285 | 230 |
| 1952-53 | .. | 342 | 282 | 332 | 274 |
| 1953-54 | .. | 357 | 283 | 291 | 231 |
| 1954-55 | .. | 292 | 237 | 297 | 241 |
| 1955-56 | .. | 340 | 264 | 277 | 215 |
| 1956-57 | .. | 394 | 313 | 327 | 259 |
| All years | .. | 331 | 261 | 290 | 231 |

## Effect of Management

In an experiment conducted over 12 years an attempt was made at Ruakura to combine all the above principles into a system of farm management and to measure the increases in butterfat production per acre and per cow above that obtained under a less careful system of management.

Two equivalent areas of similar soil type and pasture sward were used and stocked with equal numbers of cows and replacements. On one farm rotational grazing was practised with maximum conservation of hay, silage, and autumn-saved pasture. On the other milking cows were set stocked in day and night paddocks and dry stock were set stocked in another paddock. Only a limited amount of hay was made. At first calving half of the heifers were interchanged between the farms. Results are shown in the table above.

It will be seen that controlled grazing has produced an average of about 13 per cent more butterfat per acre than uncontrolled grazing. This difference has varied from 0 to 30 per cent in individual years, being least in the good and very bad years. The 13 per cent increase has been referred to as disappointingly small. However, the actual difference was 41 lb of butterfat per cow and 30 lb of butterfat per acre. At 3s. per lb of butterfat this would represent an increased return of £369 per annum to a dairy farmer with a 60-cow herd; while on a national basis the figure would be approximately £12,000,000. These are, of course, gross figures. Controlled grazing and fodder conservation do entail extra expenditure, but on most dairy farms these practices pay handsome dividends.

In the original experiment the stocking rate was the same in both herds and it has often been suggested that this limited the benefit from controlled grazing. For this reason in 1957 the experiment was modified. Four herds of 40 cows were used. Herd 1 was grazed on 42 acres under the controlled grazing system, Herd 2 was grazed on 42 acres under the uncontrolled system, Herd 3 was grazed on 33½ acres under the controlled grazing system, and Herd 4 on 33½ acres under the uncontrolled grazing system. The stocking rates for Herds 3 and 4 were thus approximately 25 per cent heavier than for Herds 1 and 2. No dry stock were carried.

It is too early to quote actual results, but the following trends are beginning to emerge.

To get the best results out of controlled grazing there must be an adequate stocking rate.

Increasing the stocking rate decreases production per cow, but increases production per acre.

If the stocking rate is pushed too high, especially under set stocking, the pasture during winter and early spring is inadequate to maintain the cows in reasonable condition and there will not be enough conserved fodder to meet the deficiency.

The effect of over-stocking is likely to be cumulative, as cows will not be able to gain condition during late spring and summer and will enter the next winter still in poor condition. If this occurs, production per acre will fall.

No attempt has been made in this article to relate the recommended practices to the economics of dairy farming, though the importance of this is fully realised; for example, subdivision and pasture conservation entail considerable outlay for fencing and machinery and the making and feeding of hay and silage involve extra work. If increased stocking means the employment of another hand in the shed, the extra return must be more than sufficient to pay his wages. The profit or loss involved in any change must be calculated by each individual dairy farmer. The advice of a number of advisory officers who have had considerable experience in this is readily available.

It is not suggested that dairy farmers should slavishly adopt all the practices that work well at Ruakura, but an understanding of the principles that have emerged from the Ruakura experiments should enable most dairy farmers to apply at least some of them on their own farms and thereby increase their butterfat production per acre.

## Conclusions

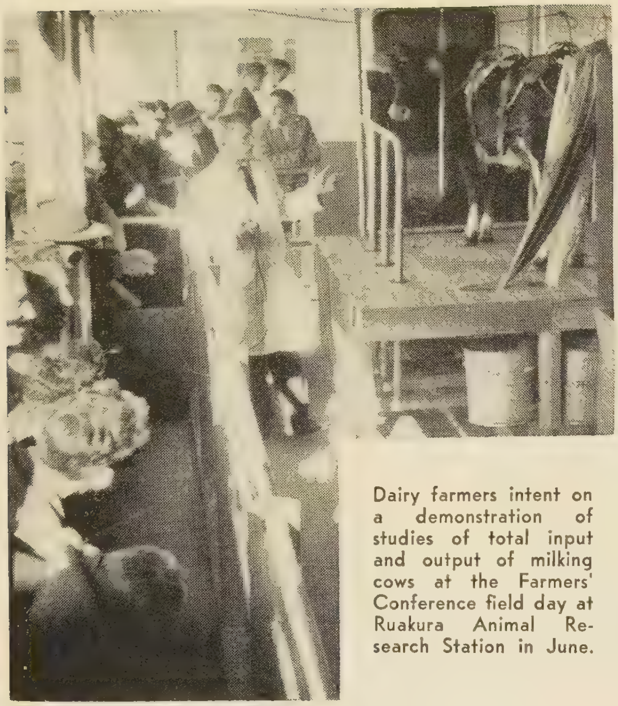
THE conclusions to be drawn from all of the experiments which have been described may be summarised as follows:

To obtain maximum production of butterfat per acre dairy farmers should adopt the following principles:

1. If new pasture is to be sown, seeds of the best strains of grasses and clovers should be used, but most existing pastures will give high returns if properly managed.
2. Before the topdressing practice is decided on the local Farm Advisory Officer should be consulted.
3. The farm should be subdivided into an adequate number of paddocks to permit controlled grazing and adequate fodder conservation.
4. During late spring and early summer pastures should be grazed at about a 4 to 6 in. level and the maximum possible amount of surplus pasture should be conserved as hay or silage.
5. A well managed dairy farm should have enough hay and silage left at the end of the winter to ensure an adequate supply for the next winter if the intervening summer is a poor one.
6. Silage should be fed in early autumn to allow the maximum area to be shut up while feed is still growing to provide adequate grazing during late winter and early spring.
7. Artificial breeding should be practised to obtain cows of high dairy merit and to make available to milking cows the pasture which would otherwise be fed to bulls. Poor producers should be culled ruthlessly.
8. Calves should be rotated ahead of the cows to ensure that they are well grown when mated and from then on should be sufficiently well treated to ensure that they are a reasonable size and in good condition at calving.
9. An adequate number of cows should be grazed to ensure that summer pastures are utilised at the 4 to 6 in. level. This is one of the most important factors in increasing production per acre, but it must be accompanied by provision of a correspondingly increased supply of supplementary feed for use in winter, early spring, and late summer. Therefore unless supplementary feed can be purchased economically, the stocking rate should not be so high as to make it impossible to conserve sufficient hay and silage to keep the cows in good condition during winter when an adequate area has been closed to provide autumn-saved pasture for late winter and early spring.
10. The health of the cows should be safeguarded to prolong their milking lives and so reduce the amount of pasture which has to be devoted to feeding replacements.

# ROUND THE RESEARCH STATIONS

## Current Work and Findings in Department of Agriculture and Department of Scientific and Industrial Research Trials and Experiments



Dairy farmers intent on a demonstration of studies of total input and output of milking cows at the Farmers' Conference field day at Ruakura Animal Research Station in June.

### *Rukuhia*

**Soya Beans** Before the Second World War, when overseas prices for butter were very low, the growing of soya beans as a feasible step toward diversification of activities on dairy farms in the North Island was investigated. A spectacular increase in the acreage of this crop grown in the United States—from 2,000 acres in 1910 to 5,500,000 in 1936—and the wide range of products that could be made from it had roused widespread interest in the possibility of growing soya beans in New Zealand. Black and Woodcock, reporting the results of these investigations in the "Journal" for October 1938, concluded that both from a commercial and an agricultural point of view the growing of soya beans was not economic in this country. The main reasons suggested were that the average summer temperatures were not high enough for good soya bean yields and that the prices for soya bean products were too low in comparison with those for the produce of other crops.

The position has changed materially since then. New varieties of soya beans have been developed overseas which are suitable for a wide range of climates. Furthermore, in 1958 Dr I. D. Blair of Lincoln College suggested that inoculation of the soya bean plants in the earlier trials may have been inadequate or unsuitable. A series of trials was therefore arranged in 1958 in which different forms of inoculum and seed of nine varieties of soya beans obtained from the United States Department of Agriculture were used.

Though the Waikato climate may not be particularly suitable for the growing of soya beans, facilities available at the Rukuhia Soil Research Station determined that the seed should be tried there to make comparisons both of varieties and different inoculation cultures. A similar trial was conducted at Lincoln College.

The yields of seed and the percentage of oil and protein obtained from the first season's trials at Rukuhia were encouraging. Further trials have been carried out in the 1959-60 season, and several semi-commercial sowings of the most promising varieties were also made in the Waikato.

One difficulty experienced is that the local intermittent summer rainfall induces successive crops of flowers in the beans and the consequent spread of ripening of the pods may complicate harvesting of the commercial crop.

Control of weeds is another problem. Inter-row cultivation alone is inadequate because of the weed growth within the rows, and some chemical control appears necessary. Results of preliminary trials with post-emergent applications of chemicals were not satisfactory and pre-emergence methods may prove better.

Further experimental work is necessary to determine the most suitable varieties, field husbandry, and weed control methods under various conditions before the commercial possibilities of the growing of soya beans locally can be properly reassessed.

### *Invermay*

**Residual Value of Phosphatic Fertilisers** Pasture production increases given over five years by annual dressings of 3 cwt of superphosphate, serpentine superphosphate, "Thermophos", and North African and Nauru rock phosphates have been compared. The first three gave comparable yields when applied on an equivalent $P_2O_5$ basis. North African rock phosphate was as good as these three only under acid soil conditions where lime had not been applied. Nauru rock phosphate gave the poorest yields throughout.

In 1957 "Thermophos" only was reapplied. This enabled measurement of the residual value of the other phosphates beside giving an indication of their rate of decline in yields.

Results to date show no decline in yields from North African rock phosphate on unlimed soil since topdressing ceased, and under these conditions it gave the best residual effect. Nauru rock phosphate also showed no decline in yields, though yields remained low as previously. Superphosphate and serpentine superphosphate yields fell off on unlimed soil by 8 to 9 per cent, which brought their production down to the level from the Nauru rock phosphate.

On limed soil superphosphate, serpentine superphosphate, and North African rock phosphate gave similar yields. This represented an 8 to 9 per cent decline in yields from the former two, but no decline in the latter, since it had been poorer over the previous five years. Nauru rock phosphate gave little decline in yields, but still remained the lowest yielding treatment.

## *Wallaceville*

### Dangers in Feeding off Grain Residues

Recent severe mortality in a dairy herd after about one to one and a half hours' grazing for two consecutive days on standing maize is typical of many cases of grain poisoning. Earlier this year more than 100 out of 1,000 sheep were lost after grazing for two days on the stubble of barley which had just been headed. Not much is known about the fundamental changes occurring in ruminants after they have eaten excessive amounts of grain, but there is an enormous development of acid in the stomachs and intestines through fermentation. No effective treatment for the condition is known.

With cattle, sheep, and horses great care must be exercised in feeding off grain residues of the type mentioned above and also wheat and probably oats.

## *Grasslands Division*

### Barley Grass Control

Recent field investigation of barley grass (*Hordeum murinum*), a common and persistent pasture weed, has shown some very interesting characteristics. Because of the abundance of this annual it was thought that seed survived in the soil for several years.

Observation confirms abundant seed setting, but not the survival of a large amount of buried seed. Seed carry-over extends merely from seeding season to the following spring, and even during that short period death of seed in the soil is quite high.

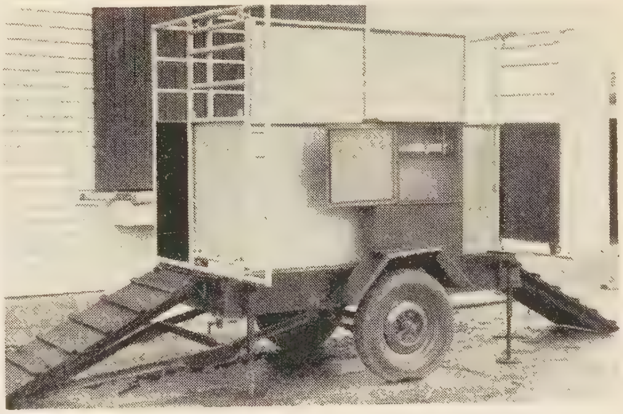
The brief cycle of seeding, autumn establishment of young plants, survival of buried seed, overwintering of established plants, and spring germination of dormant seed emphasises the need for follow-up control treatment in spring, despite apparently successful measures in the preceding autumn. Moreover, care should be taken to avoid seed transference to areas already effectively controlled, particularly as barley grass can germinate within 24 hours under favourable conditions.

Movements of stock, mainly sheep, would seem to be the main cause of reinfestation, though farm vehicles and hay cut from paddocks infested with barley grass may play their part.

## *Ruakura*

### Selection of Beef Bulls

Meat production is based on growth. Many studies have shown that fast-growing animals produce more meat from a given quantity of food than slow-growing ones. Investigations in America under feed-lot conditions indicate that growth rate is a strongly inherited characteristic. Four years ago trials began at Ruakura to see whether young beef bulls kept under normal grazing conditions could be profitably selected on the basis of their growth rate. At present over 300 young bulls in a number of different studs are being weighed periodically with the use of portable scales.



**Portable scales for weighing bulls at Ruakura.**

Each year fast- and slow-growing bulls, selected from within each stud, are mated to a herd of 300 run cows on the Waikeria Prison Farm. To see whether this method of selection is worth while the growth rate and carcass quality of the progeny are being measured.

Today dairy sires are selected on the production records of their female relatives. As a result of these Ruakura investigations beef bulls of the future may well be selected on the basis of their own growth rate performance.

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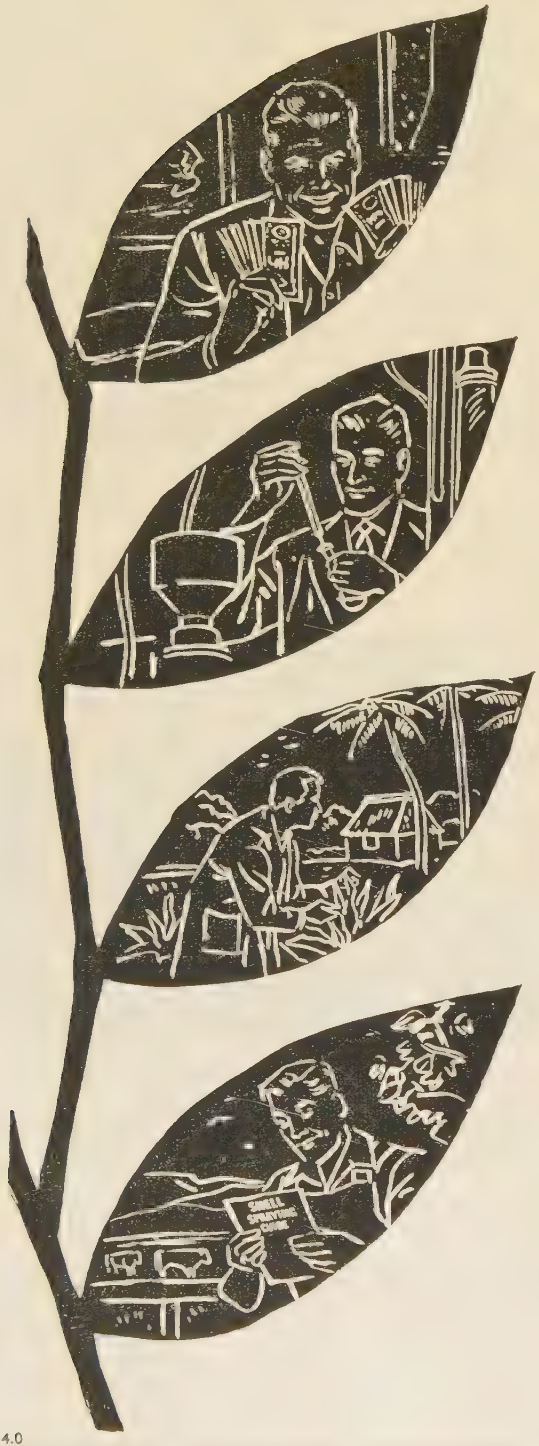

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# SULPHUR and its Effect on SOIL ACIDITY

**By A. W. HUDSON,**
Professor of Field Husbandry,
Massey Agricultural College

RESULTS from the use of sulphur applied to grasslands—in parts of the South Island in particular—during recent years have been most impressive. Lobb (1) and Lobb and Bennetts (2) recently summarised the results of field experiments in which sulphur and a number of trace elements had been applied. These articles are very informative and include recommendations for the use of sulphur and the trace elements concerned.

**Though results from field experiments and the forms in which sulphur is used for agricultural purposes have been widely publicised, only brief reference has been made to the effect of uncombined sulphur on soil acidity. At no time has a statement been made indicating the extent of such effect.**

THE main facts bearing on the point and stated simply are:

Soils may be alkaline or acid. With a few exceptions New Zealand soils are acid in varying degrees which can be described as slightly acid, moderately acid, acid, and very acid. In their natural state most of our soils are in the moderately acid to acid range.

The majority of plants grow best in a slightly acid soil, one important reason being that the availability of most nutrients present in the soil is at a satisfactory level in such a soil. Extremes of acidity or alkalinity may cause some elements to be soluble in toxic amounts while others may become so insoluble that plant growth is restricted.

Since a large proportion of New Zealand soils are bordering on the "acid" range which, normally, is also a harmful degree of acidity, there is an element of danger in applying substances which increase acidity. A small increase in the acidity of a soil which is only slightly acid is not likely to influence its productivity appreciably. However, the same increase in a soil which is nearer the borderline of harmful acidity may bring undesirable consequences. Because sulphur can increase acidity markedly and is being used on soils which are already acid, a guide to proper precautions seems desirable.

## Forms Commonly Applied

Though frequent reference has been made to the two common forms in which sulphur is applied, it is desirable to discuss these briefly. (For further details the reader is referred to an article by Lobb (1).)

### Gypsum

The first commonly used sulphur-containing substance, gypsum, is present in superphosphate to the extent of 50 to 60 per cent of the total constituents. It is one of the products of the chemical changes which take place during the manufacture of superphosphate from phosphate rock and sulphuric acid. Pure gypsum contains 18.6 per cent of sulphur combined with calcium as a sulphate. Users of superphosphate therefore apply between 9 and 11 lb of sulphur in each 100 lb of superphosphate.

Gypsum also occurs as natural deposits, the material from which is ground for application to the land. It is used in the manufacture of cement and plaster of paris also. Lobb has stated that the effect of gypsum on plant growth is more rapid than that of sulphur. Its important characteristic so far as this article is concerned is that it does not alter the intensity of soil acidity.

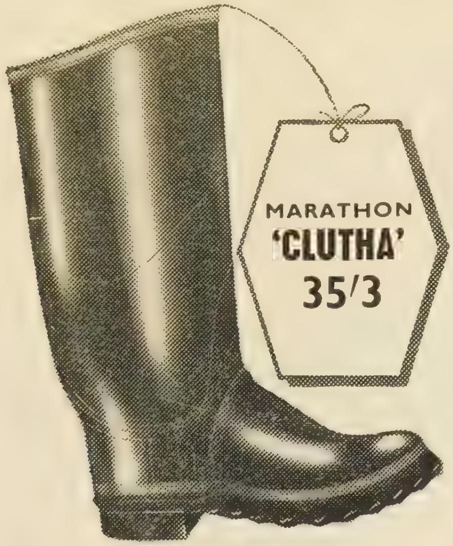
### Sulphur

The second commonly used form of sulphur is the very fine flowers of sulphur or ordinary ground sulphur, which is considerably coarser and slower in effect than flowers of sulphur. Both are almost pure sulphur. Unlike gypsum, sulphur increases soil acidity, owing to the fact that it is oxidised by a variety of soil organisms and converted ultimately into sulphuric acid. The process is very gradual and the amount present at any time very small, but inevitably the acid displaces calcium from the soil in such a way that the latter is washed out in time. Under these circumstances soil acidity increases, calcium being the important element in the various forms of lime which are added to the soil to reduce acidity.

## Liming to Counteract Acidity

The extent to which soil acidity will increase when a given amount of calcium is lost will vary according to the type of soil. What the farmer should know is how much lime is required to replace the lost calcium. Since the term "lime" is used to refer to calcium carbonate (carbonate of lime), to ground limestone, and to burnt or slaked lime, it is necessary

Heading photograph by Whangarei Candid Photos.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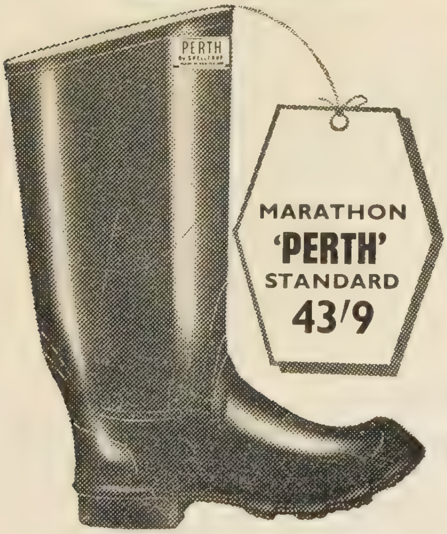
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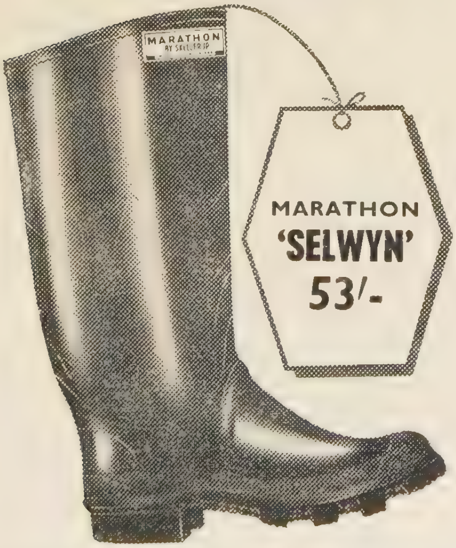
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to be more specific. In New Zealand lime is applied to the soil in the form of ground limestone almost without exception. Good limestones may contain between 85 and 95 per cent of calcium carbonate. The important practical question is:

**How much ground limestone of good grade is required to correct the acidifying effect of, say, 100 lb of sulphur?**

While the answer will be influenced by a number of factors such as the purity and fineness of both the sulphur and the limestone, it is possible to make an estimate which will be a useful guide.

A hundred pounds of pure sulphur can cause the loss of calcium which would be contained in 312 lb of pure calcium carbonate; 312 lb of pure calcium carbonate would be represented by between about 330 and 400 lb of a good grade of limestone. Since a single application of sulphur at 100 lb per acre would be unusually heavy, it is necessary to consider the problem in relation to what a farmer may use at each application and how frequently applications are likely to be made.

Lobb (1) says: "A reasonable application of sulphur appears to be 30 to 40 lb per acre". Of this about 10 lb would be supplied in the gypsum contained in 100 lb of superphosphate and the balance as added sulphur. Lobb also states: "For initial land development, rates of 20 to 60 lb of sulphur per acre appear necessary at present. For some areas a much higher rate may be needed". Later in his article he draws attention to the very small increase in acidity likely to result from the use of recommended applications of sulphur-containing fertilisers and adds: "This may, or may not, indicate that lime will be needed in the future".

Use of sulphur must cause the loss of calcium and a consequent increase in acidity with its continued application. The small extra expense of adding sufficient ground limestone to make good the loss due to the sulphur must surely be a wise insurance against a too-acid soil at a cost which will not detract appreciably from the outstanding benefits from sulphur.

In effect it means that an application of 20, 30, or 40 lb of pure sulphur will necessitate the addition of 80, 120, or 160 lb respectively of ground limestone on the basis of 400 lb of ground limestone per 100 lb of sulphur. Whether the limestone is added to the fertiliser mixture containing the sulphur or applied once in two or three years is likely to be of little consequence. Adding to the fertiliser mixture would obviate the lime being overlooked.

## No Danger on Some Soils

It must be emphasised that not all soils are in danger of being made harmfully acid quickly. Some because of the nature of their chemically active constituents are able to resist change even though they cannot prevent it entirely. Such soils will not be affected appreciably until a large number of small applications of sulphur—or any other treatment which may alter the intensity of acidity—has been used. Alternatively, some soils will have been limed recently or may be dressed fairly regularly. Others are far enough removed from the harmfully acid level to render special precautions unnecessary immediately. Officers of the Department of Agriculture Farm Advisory Division will be able to advise farmers whether or not steps should be taken to counter any possible acidifying effects of sulphur. However, except with a few soils having a surplus of lime in them, the best long-term policy will be to add the prescribed amounts of lime with the sulphur.

The writer has no desire to create doubts in the minds of farmers about the wisdom of using sulphur on soils which respond to it, but seeks rather to make them aware of possible undesirable effects that may sometimes arise but which may be avoided with simple precautions. At least one fertiliser (sulphate of ammonia) gained unwarranted ill repute in New Zealand in the early 1930s through the effects of its use on soils on the borderline of being harmfully acid.

It is hoped that what has been said will provide a more precise answer than has been given hitherto to the question of what quantity of lime is required to correct the acidifying effect of sulphur. It may at least save the application of tons where hundredweights will suffice and insure against that small and harmful increase in acidity of soils which are already too close to the danger line.

**Acknowledgments**

The original draft of this article was perused by J. W. Woodcock, Director, P. B. Lynch, Senior Principal Scientific Officer, and W. R. Lobb, Superintendent, Winchmore Irrigation Research Station, all of the Farm Advisory Division of the Department of Agriculture. I am grateful to them for helpful criticism. The responsibility for what has been said must remain mine, however.

**References**

(1) Lobb, W. R., "Fertility Problems of Marginal Areas of the South Island", "The New Zealand Journal of Agriculture", September 1959, p. 207.

(2) Lobb, W. R., and Bennetts, R. L., "Fertiliser Responses on Plains Soils of Canterbury", "The New Zealand Journal of Agriculture", October 1959, p. 317.

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# Ragwort Control

**NOT until the advent of hormone weedicides a decade ago did farmers have a really worth-while weapon to attack ragwort, but nowadays it is comparatively simple and inexpensive virtually to eradicate this dangerous weed wherever suitable preparations of 2,4-D can be used.**

RECENT large-scale demonstrations with various hormone weedkillers on hundreds of acres of badly infested pumice country have clearly shown that ragwort is best attacked with the ester of 2,4-D. This material, applied as a spray during late August-September at 1 lb acid equivalent (about 2¼ pints) per acre in 20 to 25 gallons of water through power sprayers using F.32 jets at 30 lb per square inch pressure, has consistently accounted for 90 per cent and more of seedling and root-growth ragwort by late spring.

Similar follow-up treatment of older ragwort in the rosette stage, generally about mid November, dealt effectively with these more mature plants. Thereafter control mainly centres around treating the odd plant missed in the first treatments or which may have since developed from seed.

An essential requirement in the successful control of ragwort with the hormone weedkiller recommended is complete leaf coverage. This is fairly easy to accomplish at the time of first application (August-September), when pasture growth is short, but the second treatment in November is sometimes made more difficult by excess pasturage surrounding ragwort plants. However, this can be overcome by reasonably close grazing with cattle, which leaves the ragwort standing well exposed for spraying.

In no circumstances should the recommended amount of hormone weedkiller be greatly exceeded, as not only could some clover damage result, but often the final kill of ragwort is not as good. A slow kill of top growth more efficiently kills the root system than does a quick knock-down resulting from excessively strong mixtures of hormone weedkiller.

—*C. R. TAYLOR,*
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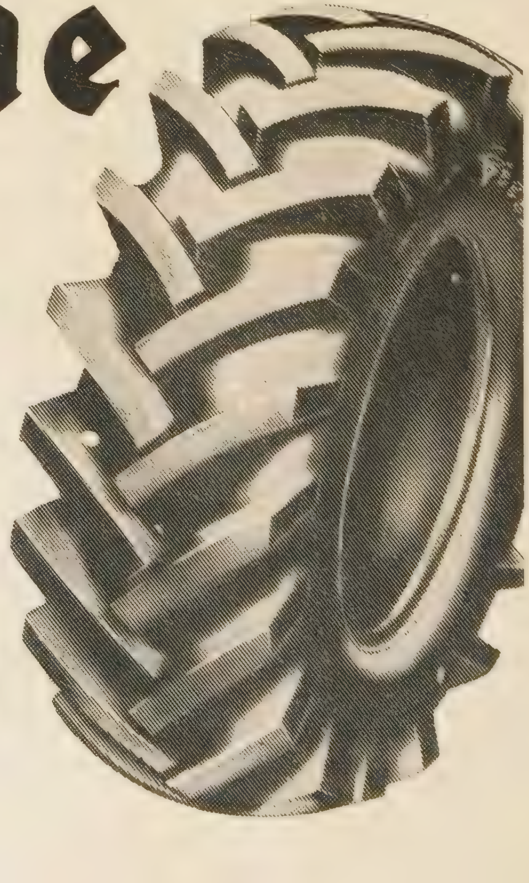

# A Little Extra Care with Sow and Litter Will Substantially Increase Pig Profits

THE factor deciding the number of pigs eventually sold as baconers and porkers is the number of pigs safely weaned. Losses after weaning are comparatively small, but between birth and weaning, and more particularly the first week after farrowing, the greatest losses of pigs occur, averaging about 20 per cent of the pigs farrowed. This problem is not by any means peculiar to New Zealand, but is found in greater or less degree in all pig producing countries. These losses can be greatly reduced by correct management and that little bit of extra care and attention that is so often lacking. In this article I. H. Owtram, Extension Officer, Pig Husbandry, Department of Agriculture, Wellington, deals with this aspect of management.

Good weaners from the one litter.

THE treatment of the sow during the four weeks immediately before farrowing has a very great effect on the number of pigs born alive and their birth weight. During this time the weight of the unborn litter, and consequently the demands on the sow made by the litter, increase enormously. If these demands are not met by an increase in the amount and quality of food given the sow, the number of pigs born alive and their birth weight are bound to be adversely affected.

The sow's ration should be increased during this period to at least 6 food units a day. Of that at least a third should consist of concentrate feed that is rich in protein, such as meat meal. Protein-rich food is absolutely essential to the building of strong, healthy piglets.

The sow should also be given the opportunity to become completely accustomed to her farrowing quarters. The farrowing house should be thoroughly cleaned out, washed down with disinfectant, and allowed to become completely dry before it is used. The sow should be put into this at least 10 days before she is due to farrow. A sow should be given a little bedding in the farrowing house, as it is natural for her to make a nest when she is about to farrow. If there is no bedding in the house, she is unable to satisfy this instinct and is therefore less likely to settle down satisfactorily.

## Farrowing

A sow should not be fed for 24 hours before farrowing and 24 hours afterward, but should have plenty of clean drinking water all the time. Accurate records of service dates and farrowing dates are essential. Gestation tables give periods varying from 112 to 115 days, but sows tend to carry successive litters for the same number of days and records of previous farrowings are a reliable guide.

If artificial heat is available in the farrowing house, it should be switched on a day or two before the sow is expected to farrow, both to get the sow used to it and to avoid getting caught out by the sow farrowing on a cold night without the heat lamp being on.

Attention at farrowing definitely pays dividends in the saving of piglets that would otherwise be lost at birth. The sow must be quiet enough not to resent attention when she is farrowing and her owner must be able and willing to spend the necessary time. It is a practice that is little followed in New Zealand, though it is quite simple to get sows quiet enough to appreciate it. If a sow does resent anyone's presence when farrowing, she is better left alone.

During the first week after farrowing the sow's ration should be gradually increased until she is getting 4½ food units a day for her own maintenance and 1 food unit for each pig in the litter. The piglets are entirely dependent on the sow for food at this stage and the more milk the sow gives the better the piglets will do. Fresh drinking water should always be available to the sow. This is of the greatest importance. It is just as important to the suckling sow as it is to the dairy cow to have an adequate supply of clean drinking water always available.

## Care of Newly Born Litters

All newly born litters are highly susceptible to anaemia. The most efficient and satisfactory way of preventing it is to allow the sow and litter a run out on clean pasture as soon as possible after farrowing. Considerable research on anaemia in newly born

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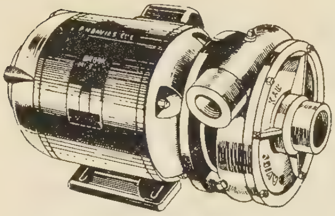

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piglets has shown that it is due to a drop in the haemoglobin content of the piglets' blood after birth. It appears to be a normal occurrence, and no treatment of the sow before farrowing has any effect on it. Very young piglets, as soon as they get out into a paddock, are always observed to eat considerable quantities of earth, and this is apparently the means by which nature counteracts the anaemic condition at birth.

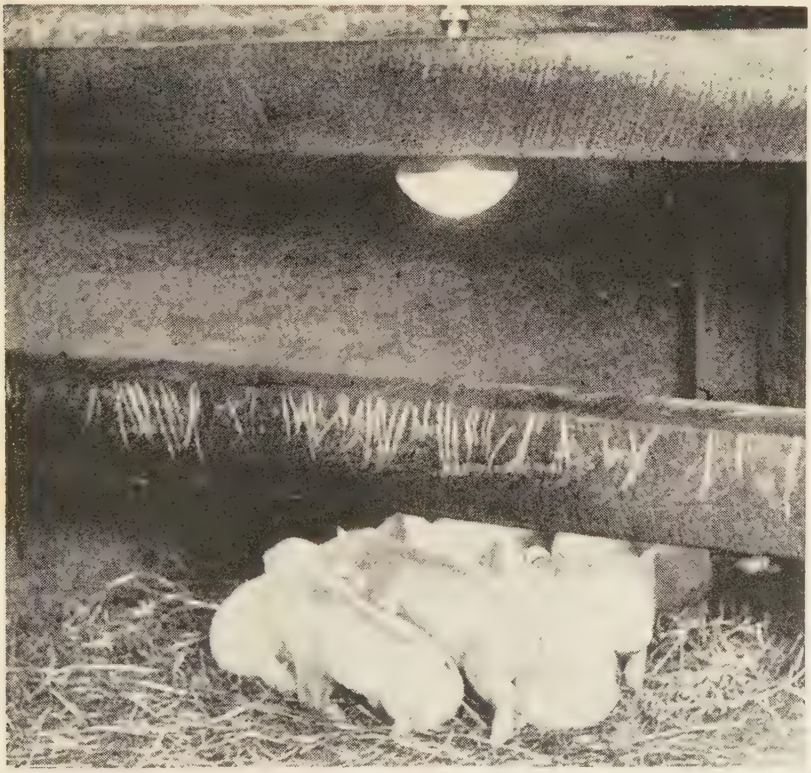
If it is impossible to allow sows and new-born litters out, the litter should be given the necessary iron to counteract anaemia. There are various ways of doing this, one of the simplest being to throw a handful of sulphate of iron on the floor of the farrowing house three times a week. Piglets can be dosed either through the mouth or by injection with one of the iron mixtures available. A last alternative is to place a sod of clean, freshly dug turf in the farrowing house. Letting the sow and litter out is the best method.

## Creep Feeding

When the litter is three weeks old piglets should be feeding in the creep. A creep is, quite simply, a place in which the litter can feed and the sow cannot. At three weeks old the piglets are beginning to outgrow the sow's milk supply and it must be supplemented to obtain the high weaning weights that are so necessary to efficient pig production.

The sow should be accustomed to her farrowing quarters by being introduced to them at least 10 days before she is due to farrow.

Supplementary feeding in the creep should begin as soon as the piglets start showing an interest in the contents of the sows' trough. This is usually when the litter is about a fortnight old, and if a start is made then, the object of having the whole litter feeding in the creep by the time they are three weeks old will be achieved.


Artificial heat at farrowing will save many piglets.

A dry meal mixture should be used at first. It should be fed in a self-feeder to ensure that it is available continuously, because it has been found that a litter suckles the sow from 16 to 18 times during each 24 hours, just as often during the night as during the day, and, if meal is available in a self-feeder, piglets will eat a little after each suckling. Pigs convert their food into meat better while they are still suckling the sow than at any other time of their lives.

Counting both the food fed to the sow and that consumed by the litter in the creep, it takes about 2½ food units to put 1 lb of live weight gain on to the litter, which will never do as well as this after weaning. It is obvious, then, that the more food a litter of pigs can be got to eat while they are still on the sow the better it is.

## Rations for Litter

The feeding of skim milk or whey should not begin until the fifth week. At this stage 1 pint of skim milk should be fed to each piglet per day in three feeds in a shallow trough in the creep. If the trough is not kept clean, digestive upsets are sure to occur and the progress of the litter suffers. At the beginning of the sixth week the quantity of skim milk should be increased to 2 pints per pig per day, at the beginning of the seventh week to 4 pints, and at the beginning of the

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The sow and litter should be let out on to clean pasture at every opportunity.

eighth week to 1 gallon. At weaning the quantity can be increased to 1½ gallons per pig per day.

If whey is used instead of skim milk, half as much again as the quantities above should be given; that is, 1½ pints at the beginning of the fifth week, 3 pints at the sixth week, 6 pints at the seventh week, and 1½ gallons at the eighth week. If the litter does not clean up all this whey, the quantity must be cut down to what they will readily consume, as whey should not be allowed to go stale in the trough.

Boar pigs in the litter should be castrated at not later than three weeks old. The earlier this is done the less is the shock suffered by the pig and the quicker the recovery is. One golden rule in this job is cleanliness. A reliable antiseptic should be used, **not kerosene or Stockholm tar**, and the site of the operation, the operator's hands, and the knife should be carefully washed in a solution of the antiseptic before each operation, which must be done in clean surroundings. If these principles are observed, there should be no trouble.

When all the piglets in the litter are feeding well in the creep management is simple until weaning. The sow and litter should be let out every day in clean grass paddocks unless the weather is exceptionally bad. This will do more toward keeping them healthy and growing well than anything else.

## Weaning

The object of management at weaning is to avoid any check to the pigs. The average fat content of sow's milk is about 8 per cent, that of skim milk only 0.08 per cent, and that of whey even less. When pigs are weaned by removing the sow the big drop in the fat content of their food must be compensated for.

An easy way is to use a little tallow, which must be free from salt. About 1 oz or 1 teaspoon per pig should be given daily in the creep, either in the trough or on the floor, from about 10 days before weaning to get the pigs used to it. At weaning the amount should be increased to about 2 oz a day and then gradually increased to 4 oz a day. This is a cheap and efficient way of preventing newly weaned pigs suffering a check.

Weaned piglets should be left in their farrowing quarters for a week to ten days until they are quite used to being without the sow. Newly weaned pigs tend to foul their sleeping floor, and to prevent this its area should be reduced by an open frame to retain the bedding, or a litter rail, which is simply a piece of 4 in. x 2 in. timber placed on edge across the sleeping floor to retain the bedding. Solid concrete blocks 4 in. thick make a good litter "rail" and are too heavy for the pigs to move.

Care and attention in the management of the farrowing sow and litter pay a very handsome dividend. One of the costs in pig production and quite a considerable one, too, is the cost of maintaining the breeding stock. The more pigs that are reared and sold per sow kept the lower this cost of maintenance will be per pig sold, and in consequence a higher profit is earned.

## Contagious Abortion Can Cause Serious Disease in Humans

BESIDE causing abortion and sterility in cattle contagious abortion can affect human beings, causing a fairly serious disease known as undulant fever.

Contagious abortion is caused by a germ known as *Brucella abortus*. In infected cows the germ frequently lodges in the udder, and drinking the infected milk may transmit the disease to human beings.

This is one reason why the Department of Agriculture urges farmers to vaccinate their herds against contagious abortion. A very efficient vaccine is available in New Zealand. Apart from the danger to human beings, the loss of calves and reduced milk output from infected herds should be sufficient reasons for farmers to adopt a vaccination policy.

Inquiry should be made early of Departmental officers or club veterinarians to ensure inclusion in the heavy programme of vaccinations starting in January and February.

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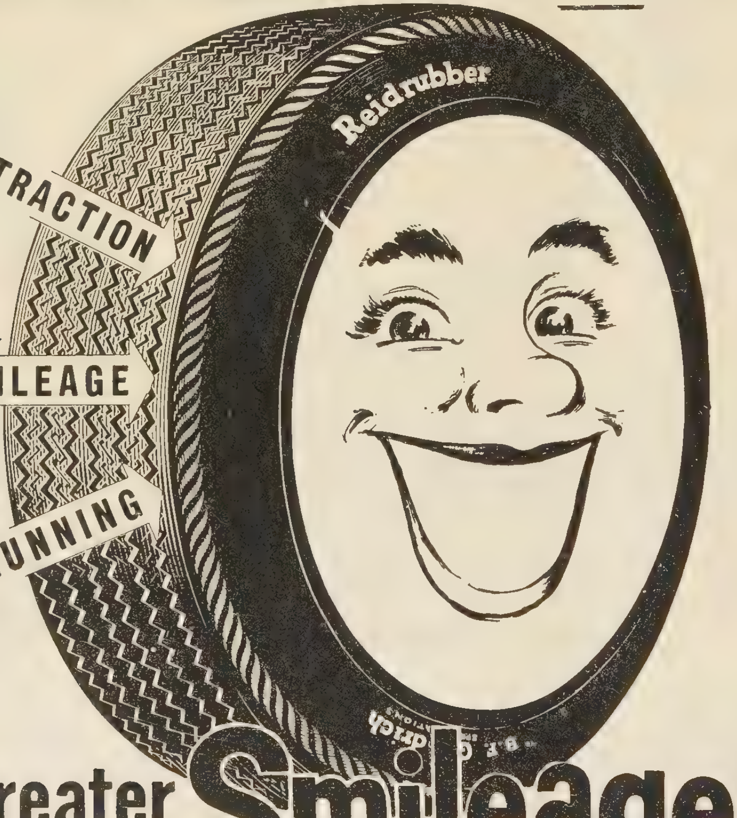

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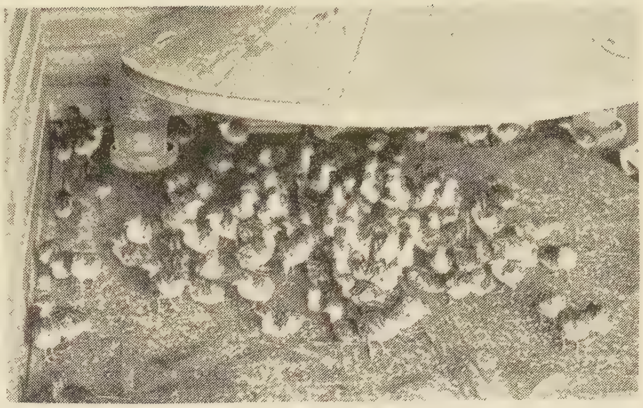
# Turkey Breeding in New Zealand

THOUGH turkey rearing is regarded with some trepidation by farmers and poultry keepers, if it is tackled competently with strict attention to cleanliness and disease prevention, there is no reason why poults cannot be reared as successfully as day-old chickens. This article on rearing young turkey poults is the third article of a series on turkey breeding by J. H. Jones, Poultry Instructor, Department of Agriculture, Oamaru. The first article, which appeared in the April issue of the "Journal", advised breeders on qualities required in breeding stock and methods of housing birds. In the May issue aspects dealt with were general management of breeding stock, feeding, and incubator management. The series will be concluded by an article in the October issue on processing and marketing of turkeys.



▲ Young turkeys on a wire frame under an electric brooder. Litter is packed tightly under the small mesh wire netting. The water drinkers have been so placed that there is little danger of wet litter, which can lead to disease.

TO those such as farmers' wives who wish to rear a small household flock of say up to 50 birds, broody hens or turkey hens can be used to mother the poults, but clean land must be used each year and protection provided against cats, dogs, children, and motor vehicles.

Day-old poults in comparison with day-old chickens are very soft at birth and must be given food and water as soon as possible after being taken from the incubator. Delivery from the hatchery to a customer must be completed and the poults settled down and eating within 24 hours.

Extra large chick boxes for the dispatch of poults are desirable, but if ordinary chick boxes are used, the number of poults packed should be only two-thirds of that of day-old chicks they would normally hold.

A turkey hen will brood 20 poults satisfactorily, but about 10 poults with a heavy breed hen is a good alternative.

The hen and her poults should be housed in a well built wooden floored coop about 3 ft square with a 6 ft x 3 ft cat-proof wire run attached. A handy type is the A-shaped fold unit; the coop and the run being integral. It can be moved sideways daily without undue effort.

The coop or fold unit should be sheltered, as wind is dangerous to poults. The grass must be short and green and the land clean, and the site should not have been used for chickens or adult poultry for at least two years. The hen should be treated with a good louse powder before receiving a brood of poults and must be kept free of lice.

The roof of the coop or fold unit should be watertight, as wet litter or nesting is fatal to poults; in exceptionally wet weather it is advisable to confine the hen and poults to the coop until the grass run has dried.

On natural brooding the hen is generally fed grain and the poults a special starter ration. To do this, after the first few days, the hen can be confined to the coop and the poults allowed through the bars into the run where troughs of starter ration are placed.

## Artificial Brooding

For rearing large numbers of poults commercially artificial brooding is essential, and advantages it has over natural methods are:

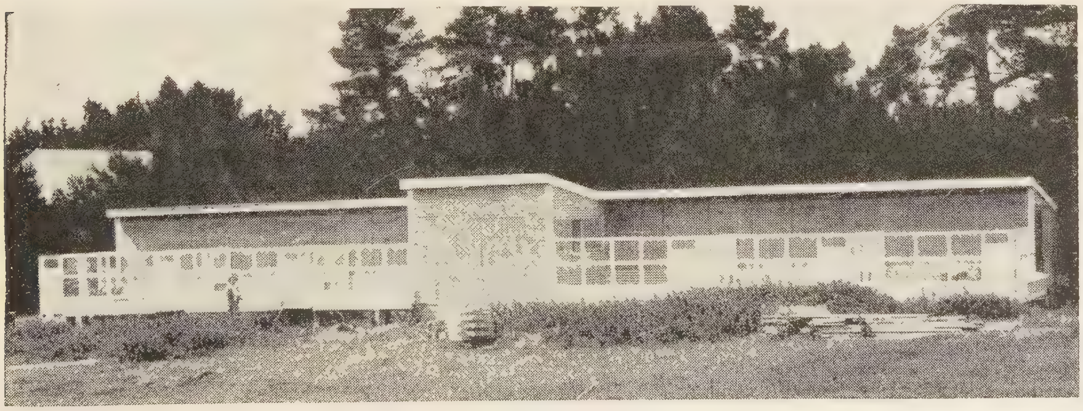
Poults can be bought at any suitable time without having to wait for hens to go broody.

A more uniform flock can be reared to be ready at marketing time.

The time, expense, and effort to rear each poult are reduced and the profit per bird is higher.

Brooding poults artificially means brooding them intensively, which raises the question of the type of house and brooding equipment, which can be any of the following:

1. Electric hover standing on litter of chopped straw.
2. Electric hover standing on fine wire mesh frames.



← Modern brooder house used for turkey raising. Note the outside sunporches and veranda runs.

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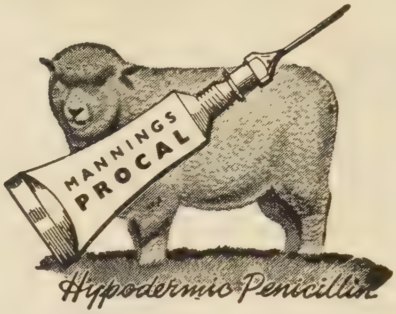
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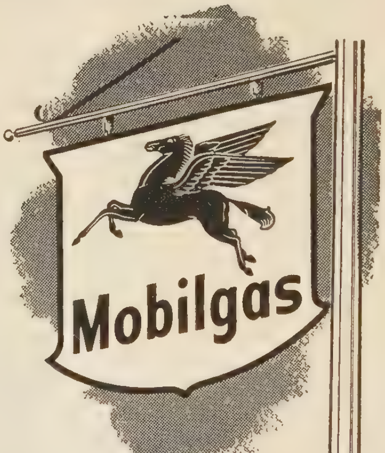

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3. Dull emitter, infrared units suspended over litter of chopped straw.
4. Tier battery brooders heated by electricity, kerosene, or hot water.

The system of brooding selected will influence the choice of the type of brooder house to be erected, the basic requirements of which are:

1. Insulation and ventilation against excessive heat and cold.
2. Good lighting.
3. The housing material should be such that it can be washed down and disinfected easily.
4. The site should be on dry ground, accessible to transport, and supplied with electric power and water.

Well and evenly grown turkey poults running outside the brooder house in sunporches or verandas.

The conventional lean-to type of shed used for chickens is suitable for floor brooding, but with poults a raised sunporch on the northern side is often used. Turkey brooder houses often have a wooden floor some 2 ft high on piles so that the floor levels of house and sunporch are similar.

The sunporch is commonly about half the size of the floor area of the house. Thus poults which are each allowed 1 sq. ft. of floor space in the house, by being let out into the sunporch, receive an additional ½ sq. ft., which will allow them to be carried in the house until up to 10 to 12 weeks of age.

The floor of the sunporch can be strong wire netting, chain link, or woven wire, all of 1 in. mesh, or wooden slats with ¾ in. to 1 in. gaps. If supports are adequate the attendant will be able to walk about the sunporch, and if the floor is constructed of movable sections and a concrete floor placed underneath, there will be no difficulty in cleaning up the droppings.

The sides of the sunporch should be about 4 ft high, and the divisions between each pen can have a water trough incorporated at floor level, allowing the poults to drink from each side.

As is shown in the illustration on page 293 a continuous feed trough has been built into the front of the sunporch. This can be filled from the outside and allows the poults to have food and water at all times, both in and out of the house, as ample food and water space must be available.

The house and hover should be prepared some time before the poults are due to arrive. The inside of the house must be well cleaned and disinfected, especially if it has been previously used for chick rearing, and the floor and feeding and water utensils scrubbed with a strong solution of washing soda at 1 lb of soda to 1 gallon of boiling water.

The brooder should be switched on at least three days before the poults arrive to dry out the house and litter and to ensure that a temperature of almost 95 degrees F just in from the edge of the brooder canopy can be maintained.

In cold weather, where it is difficult to get the brooder temperature to the correct height, the canopy should be covered with clean heavy sacks. After two weeks the body heat of the poults will raise the temperature under the canopy considerably and the sacks can be removed.

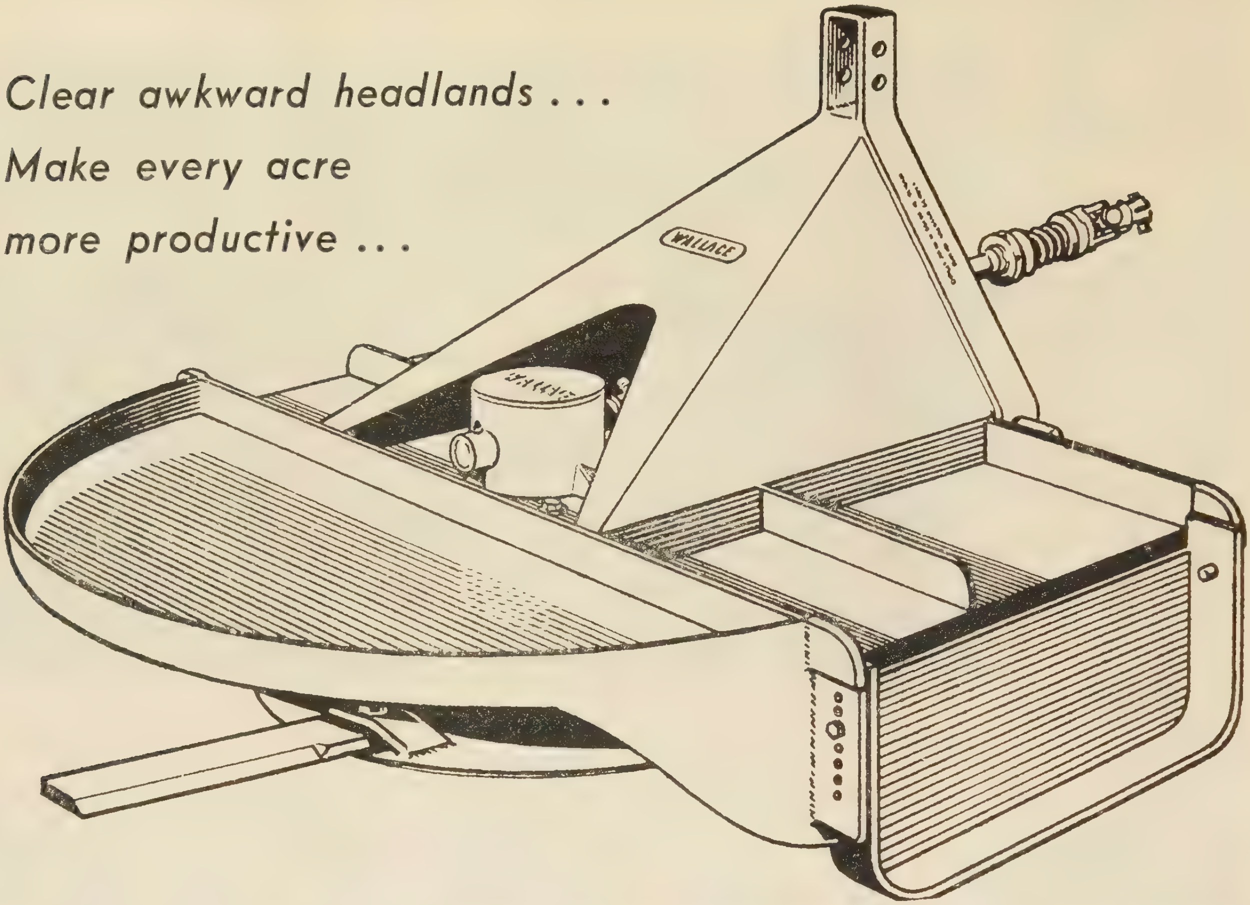
The normal chick rearing canopy brooder, about 3 ft 6 in. to 4 ft in diameter, will accommodate 100 to 150 poults for the four or five weeks they require heat, though this period may have to be prolonged if the weather is cold early in the season.

Many turkey rearers use ½ in. mesh wire frames under the canopies to keep the poults from contact with the litter, which as the birds get bigger can become very damp. If frames are used, they should be covered with hessian, or better still, tightly packed with chopped straw under the wire for the first week or so. This prevents the birds catching their hocks in the wire and assists in keeping up the temperature. Turkeys definitely need higher temperatures than chicks under the brooder for the first few days.

The brooder must have an 18 in. metal or wooden surround to prevent floor draughts and be arranged to allow a 9 in. to 12 in. ring round the canopy in which the poults can eat and drink and not get lost. Half an hour away from the heat of the brooder on a cold day can be fatal to day-old poults.

If a dull emitter infrared type of brooder is used, draughts in the brooder house must be reduced to a minimum to prevent the dissipation of heat from the infrared reflector, and the litter under the lamp should be dry, loose, and at least 4 in. deep. This depth of litter will allow the poults at night to partly sink themselves in it and so conserve body heat.

A power cut or breakdown when this system is used can be highly embarrassing, as there is little or no reserve of heat once the power is off, but the infrared system appears to be increasing in favour owing to its ease of observation and abundance of fresh air.



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Flock of growing turkeys on free range outside shelter containing perches.

The last system, the tier battery brooder method of rearing poults, though not used extensively to date in this country, is gaining in favour and is used with success overseas. With this system, as chick batteries are being used, the number of poults put in should be only 60 per cent of the number of chicks the brooders would normally carry.

The poults are placed in the battery at a day old, and the brooding compartment and the section of the run in which the poults are allowed for the first few days are covered with newspaper. As the birds get stronger and more active the paper is removed and by the end of the first week the poults are running on the wire floors of the battery.

The heat in the battery is reduced gradually until at three to four weeks it is turned off altogether and the birds removed to carry-on cages, where they remain until they are taken out on range or transferred to intensive houses or fattening cages.

With this system many turkeys spend their lives on wire and because they have no contact with the ground or their own droppings, it is claimed that disease losses are reduced considerably.

When the poults are first received they should be placed in or under the brooder the temperature of which is between 95 degrees and 100 degrees F and allowed to settle down for an hour or so before being introduced to food and water.

Poults are rather shy and nervous feeders and visits at frequent intervals are necessary during the first few days to accustom them to the attendant and ensure that they are finding the food, water, and warmth.

The best guide to the heat requirements of the poults is their behaviour during both the day and night. During the day the temperature of the brooder must be high enough to allow them under for a quick warm up and then out again to feed, and at night the poults should be settled comfortably on the outer edge of the canopy. If the temperature is too low, they will huddle in the centre or corners and either suffocate or die of chill.

At about three weeks of age the poults can be given the run of the floor of the brooder house, requiring about 1 sq. ft. per bird, and if the weather is sunny, allowed out on to the sunporch. About this time the number of feed and water troughs should be doubled, as poults grow rapidly and insufficient or badly lit feeding or watering space is disastrous to growing turkeys.

Throughout the brooding stage and irrespective of system, a constant watch must be kept for signs of ill health such as moping and loss of appetite. In warm, damp weather coccidiosis must be guarded against, and cleanliness of litter and feed and water troughs is important to health.

## Growing Stage

The poults at seven or eight weeks of age and weaned from the heat and hardened off are ready for their rearing quarters. The grower must now decide whether to continue with the intensive system or turn to free range.

## Range Rearing

If free range is to be used, and to date most turkeys in New Zealand are reared in this way, ample clean ground must be available. With commercial flocks a large acreage of good young grass or lucerne is needed over which the flock can be rotated annually. Constant moving of the turkey shelters and perching platforms with their attendant feeders and water troughs to a clean site at least once a week, and in wet weather sometimes twice, will help to keep in check such diseases as blackhead and coccidiosis, a severe outbreak of which can wreck hopes of a successful rearing season.

If adequate reasonably flat clean land is available, the cost of rearing equipment for the free range system is considerably less than that of the

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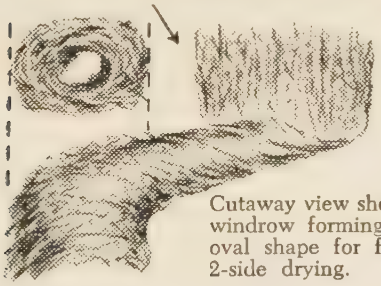

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intensive system. Essentials for range rearing are:

1. Plenty of clean range.
2. An efficient wheeled tractor and trailer for moving shelters and carting feed.
3. Plenty of feeders of the sheep feeder type large enough to hold up to ½ ton of grain or mash. Mounted on skids they can be towed with the shelters.
4. Half inch polythene water pipe with ballcock fitted water troughs mounted on skids. As an abundance of fresh, clean water is essential for turkey rearing, a continuous supply must be provided close to the feed hoppers.
5. Large, well built perching platforms mounted on skids and built of 4 in. x 2 in. timber bolted together. The best type of perching platform has an iron roof and a solid back which protects the young poults early in the season when the weather can be wet and cold, and as most turkey ranges are open and extensive, wind protection is a necessity.

Shelters should be as strong and heavy as possible, as nothing can cause panic and damage to turkeys more than perches breaking under them or shelter up-ended by the wind.

As the birds grow and require more perch space, 12 in. per bird is desirable. Additional perching platforms of a more simple type without a roof can be introduced and from then on the birds will live entirely in the open air.

Flock of growing turkeys round food hopper. Note the perches set out in the open, as compared with the perches housed in an open-fronted shelter (see illustration on page 297).

One of the greatest assets in rearing turkeys on free range is the assistance of a well trained sheep dog, as, like sheep, turkeys will go much better for a dog than his master.

TURKEY RATIONS RECOMMENDED

| | (1) Starter mash 0-12 weeks All mash | (2) Grower's mash 12 weeks to maturity Grain/ balancer | (3) Breeder's mash Grain/ balancer |
|---|---|---|---|
| Bran or pollard .. | 10 | 15 | 15 |
| Coarse ground wheat | 34 | 20 | 21 |
| Coarse ground barley | — | 19 | 20 |
| Coarse ground maize | 10 | 10 | 10 |
| Coarse ground oats .. | 5 | — | — |
| Meatmeal (55 per cent) | 24 | 20 | 15 |
| Milk power .. .. | 10 | 5 | 8 |
| Ground limestone or or oyster shell dust | 2½ | 2 | 2 |
| *Salt (manganised) .. | ½ | 1 | 1 |
| †Vitamin premix .. | 1 | 2 | 2 |
| Dehydrated lucerne meal .. .. | 3 | 6 | 6 |
| | 100 | 100 | 100 |

* Manganised salt: Mix ½ lb of manganese sulphate with 9½ lb of common salt.

† Vitamin premix: Amount of vitamins added to be according to manufacturer's instructions.

(1) Starter: This is an "all-mash" ration; ensure an ad lib supply of hard grit of suitable size.

(2) Grower: Designed to be fed with not more than equal parts by weight of whole grains; limestone grit or oyster shell free choice; hard grit free choice.

(3) Breeder: Designed to be fed with not more than equal parts by weight of whole grains; limestone grit or oyster shell free choice; hard grit free choice.

## Feeding

With proper conditions and management either all mash feeding or grain and mash ration fed free choice is satisfactory.

During the first eight weeks under the brooder a starter mash high in protein and energy is necessary; in addition the vitamin A and D content of the ration must be about double that considered satisfactory for day-old chickens. Lucerne meal can be incorporated in the starter mash or finely chopped, fresh succulent green feed can be fed.

The ration should not be changed until after the brooding stage and the birds are settled down either out on range or in an intensive rearing house. Any change in diet made at the same time as birds are moved from familiar surroundings is most unwise; birds should first have settled down in their new environment.

From then on grain can be introduced, preferably wheat to start with and later good barley or oats depending on prices. Some turkey growers, using excellent free range, feed mainly grain and a meatmeal vitamin supplement to the growing birds with both insoluble and calcium grit ad lib, with most successful results.

Intensively reared birds cannot supplement their diet from natural sources, and so greater care must be taken to balance the ration. The all dry mash or dry mash and grain supplement is favoured by intensive turkey growers, as the turkeys spend a considerable time feeding and picking over the dry mash, thus avoiding boredom and its attendant vices.

A daily feed of succulent green feed is a great help in keeping intensive birds healthy and active and eating to their full capacity.

Any check in food consumption of the birds at any stage of life should be regarded as most serious and investigated immediately. As the prime object of the turkey grower is to convert a minimum amount of food into a maximum amount of meat in the shortest possible time, a check in growth rate can be disastrous to profits.

The grower must endeavour to have his flock in prime killing condition and with an acceptable degree of finish at about 25 weeks of age, and before the food conversion rate drops to an uneconomic level. This can be accomplished only if a bird of the right strain and type is reared, and if management and disease control are first class.

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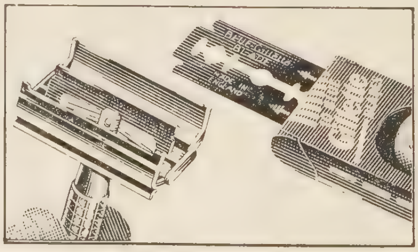

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[*Elliott*

▲ Pansies for thoughts. One of the many flowers which were used to convey a message.

# Old Fashioned Flowers

By JOY WATKINS,

Horticultural Advisory Officer, Department of Agriculture, Auckland

INTEREST has been reawakened in the old familiar flowers. These have an enduring quality that can be reassuring when each year brings a new rose or lily to be acclaimed for a season or two and then superseded. The old flowers can almost be picked out by their names: love lies bleeding, bleeding heart, love in a mist (or devil in a bush), lily of the valley, tiger lily, Solomon's seal, mignonette, Columbine, autumn crocus, snowdrops, winter roses, snowflakes, daphne, bachelor's buttons, butter balls, golden rod, Jacob's ladder, stocks, wallflowers, pinks, thrift, fritillarias, cowslips, cornflowers, and lilac. The best of the newcomers are being called by common names too, such as the butterfly bush, satin bush, silver tree, and blue butterfly bush.

THE first settlers to New Zealand brought with them seeds and roots of flowers. Of these, some are now numbered among our weeds: wandering jew, periwinkle, arum, foxglove, tree lupin, broom, gorse, fennel, honeysuckle, montbretia, pheasant berry, oxalis, briers, and blackberry.

Others are found in open country or in the bush, indicating that there once had been a garden there. These include the pink and blue granny bonnets which show through the brambles where the goldminers once had their shacks; the nasturtiums spilling down the banks of a stream; belladonnas by roadsides; Californian poppies in the shingle of Southland rivers; a patch of freesia growing thick in the close turf of a paddock, and the old double daffodils in big bright clumps under ancient apple trees, marking a decayed orchard which was in its prime 50 years ago.

## Old Roses

Roses round the door are a feature of cottage gardens in Europe, and their popularity in early days in New Zealand can be judged from the many old species and varieties which are growing wild in hedges or on the sites of old homesteads today. Cecile Brunner, moss roses, and similar small and dainty types are back in gardens, though sweet brier has to be ruthlessly attacked with weedkilling sprays, as it grows and spreads vigorously.

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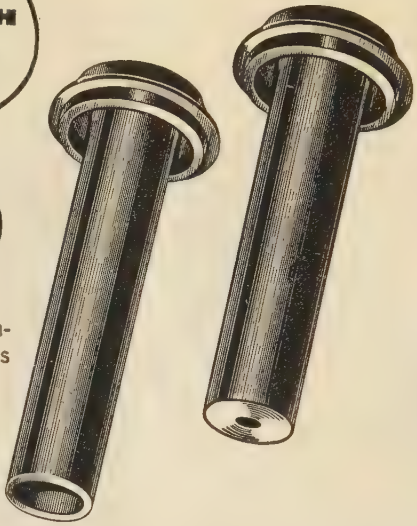

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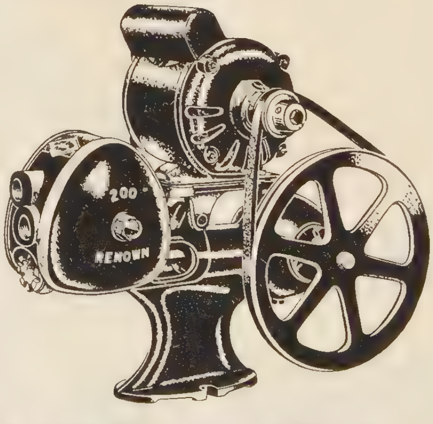

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## Scented Flowers

The pot of cherry pie, heliotrope, was once common, and during summer it was used in formal bedding schemes, usually being grown as a standard so that its spicy fragrance could be more readily appreciated. Compared with many of our other garden plants it looks somewhat drab, but its scent is unique and its free flowering makes it worth a place in frost free gardens.

Many of the old fashioned flowers were treasured for their scent. The scent of "Jessamine" was distilled from *Jasminum grandiflorum* and *J. sambac*, the latter now growing as a weed in some northern parts of New Zealand, while summer and winter flowering jasmines are to be found in most gardens.

Other scented plants in cottage gardens a century or more ago were the myrtle, a sprig of which was frequently placed in wedding bouquets; lavender and woodruff, which were used to scent linen; elder flowers, lavender and rose petals, which were made into toilet waters or pot pourri. Lemon scent is always welcome, and as in colder climates lemons could not be grown except in the orangeries of the wealthy, there were lemon-scented verbena, balm, geranium, and several other herbs to take its place.

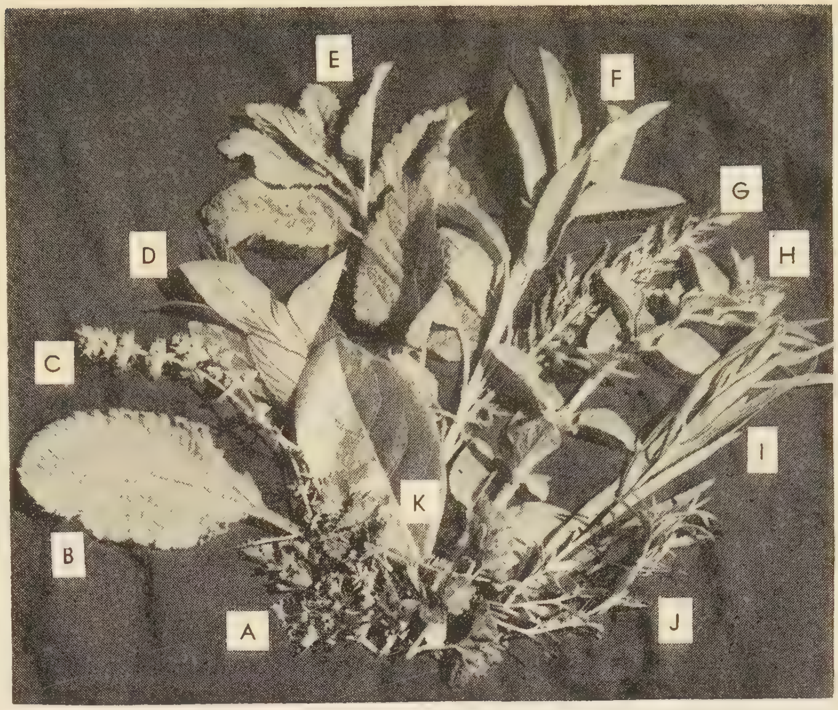
## Herbs

Herbs were used extensively years ago to flavour otherwise unappetising food. Large flocks and herds could not be kept on the scanty vegetation through winter, and all surplus stock was sold or slaughtered in autumn, most of the meat being salted down or dried for winter use. Herbs helped to vary and sometimes to mask the flavour of the meat and to make it more palatable.

Recipes for flavourings, beauty preparations, and medicines were handed down from mother to daughter, and a herb garden was essential to the housewife. Mint, thyme, marjoram, sage, and bay were commonly used, as they are today, and chervil, chives, fennel, dill, basil, chamomile, tarragon, and many others were used less frequently.

More recently, the interest in continental cookery has led many housewives to experiment with the use of herbs. Many of them can be grown easily in New Zealand gardens and the flavour from freshly gathered herbs is generally far superior to that from the dried products which are available in the shops.

Many other plants, thought to have medicinal properties, were commonly grown, such as marigold, gillyflowers, cornflower, nasturtium, lily of the valley, larkspur, mullein, roses, primroses, hollyhocks, and houseleek.



Some common herbs: A—parsley, B—borage, C—thyme, D—spearmint, E—balm, F—sage, G—yarrow, H—marjoram, I—tarragon, J—winter savoury, and K—bay.

## Bee Flowers

As honey was needed for sweetening and medicinal purposes, flowers were included in the shelter of the home garden so that on windy days the bees could still work near their hives or skeps. Thyme and marjoram, sage, lavender, catmint, chicory, daphne, wallflowers, foxgloves, arum lilies, peony roses, and heather are a few which are particularly attractive to bees.

Blue flowers, particularly those with a white or cream marking, are most readily seen by bees. If this colour is combined with a distinct scent, it is quickly found by worker bees. Plants which flower very early in the year are most valuable, as they stimulate the honey flow early.

## Say it with Flowers

No account of old fashioned flowers is complete without mention of the custom of giving posies of flowers, called tussie-mussies, to convey some special message: Forget-me-nots, pansies for thoughts, thyme for courage, red roses for love, etc.

## Flower Paintings

The old flowers were often worked into paintings and tapestries. In large tapestries used as wall hangings the background of hunting scenes or of legendary figures like the "Lady with the Unicorn" frequently portrayed the animals and flowers of the country where they were woven. The Madonna lily figures largely in religious paintings, being symbolic as well as beautiful, and abounds in cottage gardens in Europe.

Flower paintings have done a great deal to add to our knowledge of the flowers of yesterday. Many painters were employed to reproduce the outstanding flowers of their patron's gardens, while amateur and professional painters attempted to portray the flowers that inspired them.

Redoute's roses from the Malmaison gardens are now well known, as are the sunflowers of Gauguin and van Gogh, but there are other innumerable paintings in water colours and in oils both of individual flowers and of profuse arrangements of every kind of garden flower.

Auriculas have a strange, precise beauty of form which does not appeal to the majority of modern gardeners. In the past they were so popular that the introduction of a new variety was greeted as a new rose variety is today and they were to be seen in most back gardens or in windowsills in the north of England.

Varieties of primulas too were collected, and there were green flowers, Jack-in-the-green, hose-in-hose, double and single, laced and self coloured, to

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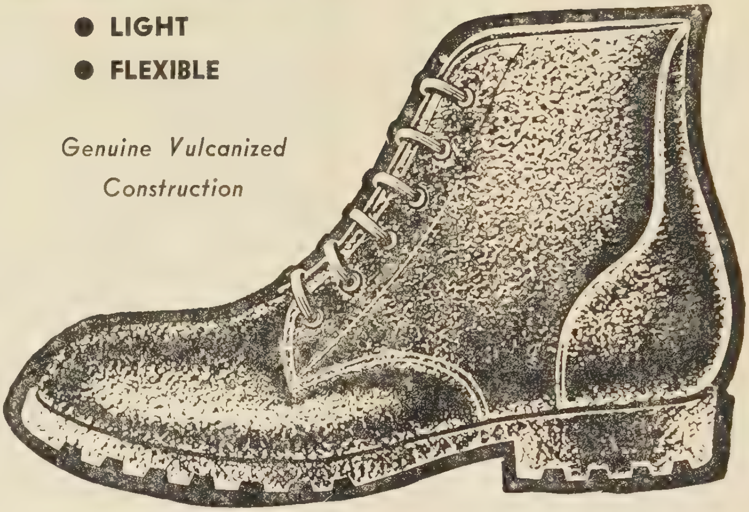

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brighten gardens in winter and early spring, growing in sheltered beds or as an edging to borders.

Violets and pansies are unlikely to go out of favour. Violets appear in pink, yellow, white, purple, and blue. Some which are desirable commercially have little scent, but large flowers and long stems; though what is a violet without scent? In Northland it should be possible to grow the famous Parma violet as well as the sweet violet. Pansies in rich colours are now available in winter as well as summer varieties, and they have a universal appeal.

Tulips are as popular as ever and the new hybrids have extended the range of stem length, colour, and shape. South of Auckland they are reliable bedding plants and flower arrangers use them for formal and informal designs. If they are soaked in deep water before being placed in a bowl, their stems will curve most gracefully and almost arrange themselves. They are seen to advantage like this in some of the old paintings of mixed bouquets.

The story of old flowers is not complete without mention of monkey musk (*Mimulus*). It is still bright and attractive enough to grow, but is without scent, which it once had; a cool damp corner of the garden, particularly beside a stream or pond, is suitable for it. The newer varieties are in reds and yellows and are very easy to grow.

Fashion has affected many old plants. The fuchsia, a favourite in Victorian times as a pot plant or stiffly trained in formal bedding schemes, has gained greatly in popularity with the introduction of new varieties, largely from America. It is one of the most free flowering and adaptable plants and these qualities are once more being appreciated. On the west coast of Britain they are still used as colourful hedges to protect cottage gardens from salt-laden winds.

Camellias, like fuchsias, are coming back into favour, the varieties distributed since the war being a distinct improvement in colour, size, and form on the old types, which still flourish in pioneer gardens. Camellias provide colour and flowers for cutting during winter months and once established need very little attention.

The gardens of people who love flowers have a charm of their own. The original treasures have been added to with plants grown from slips and seeds given by friends. They are gardens of memories as well as beauty. Perhaps the appeal of herb gardens, knot gardens, or those planted with flowers from the Bible, or flowers seen and mentioned by Shakespeare is that they help to give a more lively sense of the past, as an ancient building or tree can do.

It is interesting to speculate on which of the newer plants gathered in New Zealand gardens will become the favourites of future generations. It could be some plant which as yet has only a long Latin name, perhaps the first pink daffodil, or more likely the kowhai, hibiscus, or butterfly bush.

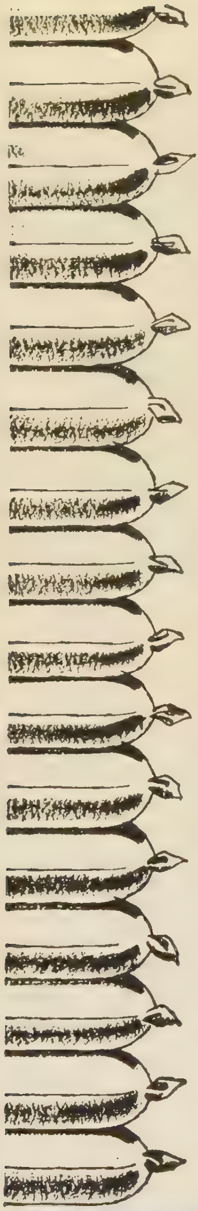
**Recommended Books**

Books on this subject are "Herbs, their Culture and Uses" (R. E. Clarkson), "Old Garden Roses" (E. A. Bunyard), "Manual of Shrub Roses" (G. S. Thomas), "Pioneers in Gardening" (Miles Hadfield), "Men and Gardens" (N. Fairbrother), and "Flower Paintings through Four Centuries" (M. H. Grant).

[Elliott

▲ Dusty Miller (auricula). A great favourite as a pot plant in the north Midlands of England during the 17th century.

← "Who'll buy my sweet violets" has been a familiar cry of London flower sellers for centuries.



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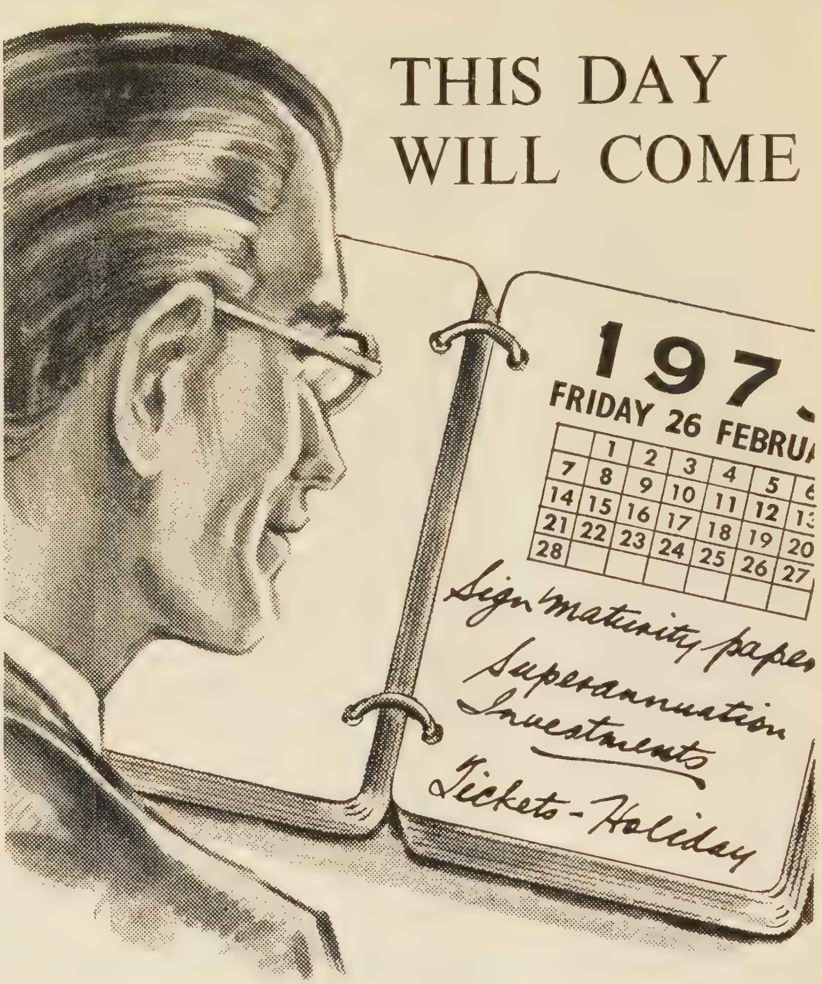

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# Garden Work for October

## FLOWER GARDEN WORK

[Elliott

Dwarf bedding dahlias are useful for the front of a border or alone. They are easily raised from seed and flower the first summer.

Newly planted trees and shrubs should be given a good soaking as necessary, and a mulch applied to retain the moisture in the soil. Black plastic for use as a mulching material is fairly cheap and efficient; one specially produced for the purpose is only .0015 in. thick and costs about 30s. for a 200 ft x 2 ft roll. Thicker plastic is no more efficient or longer lasting but it costs more. Alternative mulches are compost, untreated sawdust, leaf mould, or a thin layer of lawn clippings. Compost made from a mixture of untreated sawdust and lawn clippings is dark and crumbly and easy to handle. Mulches should be kept well away from the stem of the tree.

If a recently planted tree or shrub begins to die back from the tips in spite of mulching, check to see if it is firmly planted. If it is loose in the soil, the roots will not have good contact with the water supply, and will die off. Press the soil firmly round the roots with the heel, when the soil is damp and friable. A clay soil could become puddled and airless if trodden when wet.

Dying tips (unless diseased) should not be removed until new shoots begin to grow, as the sap in them may travel back into the lower parts of the shoot and so assist recovery of the plant after the shock of transplanting. Plants which are not growing well should not be given manure or fertiliser. Even water should not be given unless it is really necessary, as excess water or fertiliser can damage a root system which is already weak.

Plants in exposed positions will grow more vigorously if some shelter is provided during the first season. A screen of scrim from ground level to just above the height of the top can be supported on the windward side by three or four firm stakes. Alternatively, a very thin clear plastic sleeve can be used. This has the advantage of letting in the light while giving wind protection from all sides. In very hot weather during summer it can be raised a few inches to allow passage of air at ground level. Plastic for this purpose should be bought as a tube, as a home-made join using heat or staples is liable to tear. In new gardens shelter can be provided by fixing scrim all along the boundary fence on the windward side.

### Staking

Unless dwarf or particularly sturdy plants are grown, some staking is usually necessary in the herbaceous border and it is most easily carried out when the growth is short and the ground still comparatively soft after winter rains.

Firm, twiggy branches of any readily available tree or shrub—manuka, beech, elm, and even privet—can be used, pointing the bases so that they are more easily pushed into the soil. These supports should be so placed that the young shoots will grow up through the branches. Staking when the plants are almost in flower cannot be done as effectively and inconspicuously and it is more likely to damage the plants. Bamboo canes or manuka stakes can be used where twiggy branches are not available, placing four or five round each group of plants and running a string round the outside and across the centre. As the plants grow, a further string support can be added higher up.

Tall, heavy spikes of gladioli, delphiniums, and similar flowers require individual bamboo or manuka stakes. Gladioli stakes should be inserted as soon as the spike emerges from the leaves. If it is placed on the side away from the curved tip of the spike, it will be at the back of the flowers as they open.

During the staking of herbaceous plants any very thin weak shoots should be removed. Dead flower heads should be cut off regularly to encourage the formation of more buds. Finally, hoe the border to destroy weeds and to remove footprints, but be careful not to disturb the shallow roots of the plants.

### Bedding Plants

As spring bedding plants finish they should be removed and the ground prepared for the summer display. Polyanthus plants can be divided up and replanted in a shady position in soil which is well supplied with compost. Undivided plants can be left to set and shed their seed, many of which will germinate in the soil round the parent plant. Forget-me-not, cineraria, and *Primula malacoides* can be treated in the same way, providing seedlings for autumn planting.

Polyanthus seeds can also be sown as soon as they are ripe in boxes or frames of prepared soil. Seed which has been stored for any time does not germinate so freely, and seedlings may emerge at intervals during the year after sowing. The germination of polyanthus seed is also inhibited by lack of light, so the seed should preferably be sown on the surface of the soil, or covered very thinly. It must be kept moist, particularly when beginning to germinate, as an hour or two of complete dryness can kill the seedlings. For this reason, seed sown on the surface of a box is watered in, covered with polythene or glass, and placed in shade until the seedlings are

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well developed. They can be pricked out as soon as they are large enough to handle.

Before replanting the bedding scheme add compost or leaf mould to improve the water-holding capacity of the soil during the hot, dry months. If the soil is poor, a balanced fertiliser mixture should be worked into the topsoil at 4 oz to the square yard.

Of the many summer bedding plants available the most reliable are usually begonia, zinnia, salvia, celosia, and portulaca.

Zinnias are available from the dwarf, small-flowered varieties to the large and showy dahlia-flowered strains. Some have quilled petals and others have broad petals with the tip of another colour. Further plantings of gladioli can be made, dusting the corms with DDT to protect the young shoots from thrips which might have overwintered on the corms. Begonias, dahlias, cannas, and other frost-tender plants can also be planted as soon as conditions permit.

The edges of lawns should be trimmed regularly, preferably after mowing. This does more than any other operation to make the garden look spick and span. Edging tools make this work easier.

## Hedges

Most hedges need regular clipping to maintain close, even growth. See that the blades of the hedge shears are sharp and the washer is in position and the nut tight; otherwise the job will be harder.

After flowering, shrubs can be pruned and dead flower heads or spikes and dead, diseased, weak, or crossing branches removed. Those which flower on one-year-old wood should be pruned back hard. The others should be thinned if necessary, any very old stems cut out, and the bush shaped.

Large old bushes which have not previously been pruned should not be cut back hard into old wood unless it is known that the particular species will sprout from old wood. Many shrubs, waratahs for example, will die if they are cut back into old wood. If the response to pruning is not known, it is better to get advice or to cut back only one or two branches at a time. Bushes which are greatly overgrown should be replaced with young plants. If the same variety is wanted, it can be propagated by cuttings or aerial layers from the existing old plant, if that is healthy.

## Pests and Diseases

**Gerbera** leaves may be affected by leaf spot disease. Badly affected leaves should be removed and burnt and the plants sprayed with bordeaux mixture at 4 oz of bluestone, 5 oz of lime, and 4 gallons of water, copper oxychloride at 3¼ oz in 4 gallons of water, or zineb at 1½ oz in 4 gallons of water. A disease which assumed importance on gerberas in New Zealand for the first time last year is white rust. Creamy white pustules appear on the under sides of leaves. When touched with the finger the white spores come away as a dust. Control is with double strength zineb solution (3 oz in 4 gallons of water). Cut off and burn any badly affected leaves before spraying and repeat the spray every 10 to 14 days to maintain a protective cover on the leaves.

**Carnations:** Plants which become strawy in appearance and gradually die or those which collapse suddenly are affected by one of the many root and collar rotting or wilt diseases. These usually become more frequent if carnations are grown repeatedly in the same soil, particularly if cuttings are taken from infected plants. It is advisable to propagate only from completely healthy plants and to plant these in fresh, well drained and limed soil. If only one or two plants in a carnation bed are affected, the plants and the ground round them can be drenched with copper oxychloride at 1 lb in 10 gallons of water to 5 sq. yd. to check the spread of infection. Badly affected plants should be removed and burnt immediately.

**Thrips:** During hot, dry spells thrips damage becomes evident as a silvering of the leaves. The tiny sucking insects are visible on the backs of the leaves and sprays should therefore be

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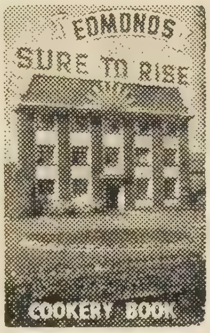

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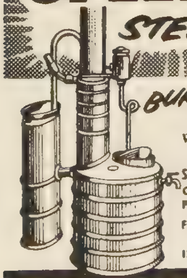

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directed upward, if possible. DDT emulsion at 1 fl. oz. in 4 gallons of water or malathion at 1 oz in 4 gallons applied regularly throughout hot weather will prevent serious damage. A damp atmosphere round the plants discourages this pest, so watering and spraying over the leaves with clear or soapy water will help.

## Glasshouse and House Plants

During summer cyclamen are most easily cared for in a shade house or plunged to their rims in the soil or sawdust in a shady place outdoors. A layer of polythene under the pots will prevent the entry of worms. If trouble is experienced with moss growing on seed boxes, a light spray of thiram at ¼ oz of 80 per cent wettable powder in 5 pints of water will control moss and damping off disease without damaging the seedlings. The moss begins to turn brown about a week after spraying. One pint of the spray is normally sufficient for five boxes.

## Shading

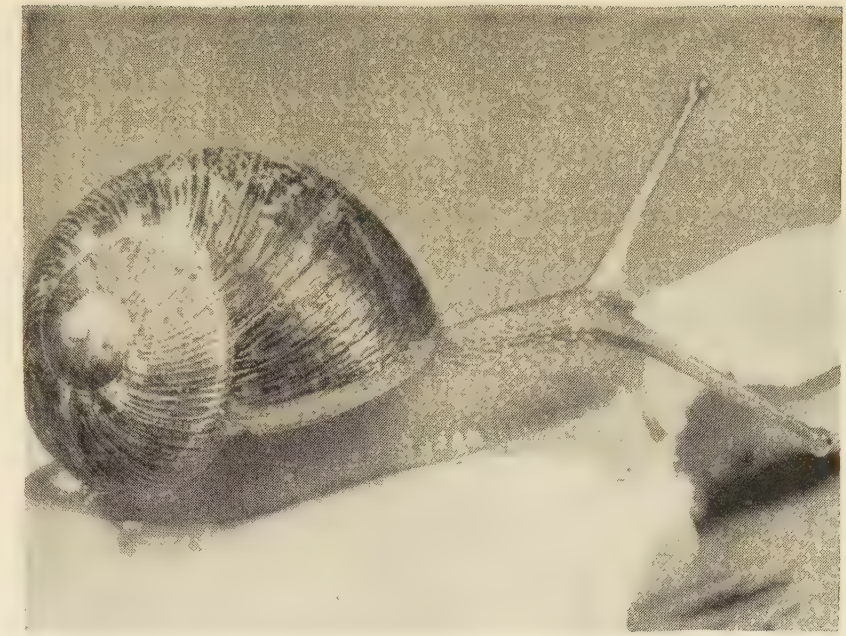
Glasshouses should be given some shading now that the sun is hotter; otherwise plants will dry out quickly and the leaves and flowers of some of them will be scorched. Blinds on the outside of the glasshouse are the most expensive but most satisfactory method of shading, as they can be removed during dull weather when the plants need the maximum light and sun heat. Cheaper methods of shading are with lime, whitening, or flour mixed to a paste and then more water added until it is the consistency of thin cream.

If a spraying machine is to be used to apply the wash, it should be filtered to prevent blockage of the nozzles. To ensure that the shading will stick on longer add a small quantity of skim milk or linseed oil to the wash. At the end of the season shading can be removed with warm water and detergent, though it is difficult to remove if linseed oil has been used.

Old glass which is covered with a green slime can be cleaned with a mixture of bluestone, spreader or detergent, and water; for example, ⅓ oz of bluestone and ⅓ oz of Agral L.N. or other spreader in 4 gallons of water.

Recently, a white plastic has been manufactured for glasshouse shading. The .003 gauge is suitable for this purpose and is half the cost of .005 gauge. White plastic reflects a large proportion of the light and heat rays from the sun, so that the glasshouse is cooler. Tacked or fixed with battens on the outside of the glass the plastic produces the maximum cooling effect, but is likely to be damaged if the glasshouse is exposed to winds. For this reason the white plastic is more often attached to the bars on the inside of the house, from which it is easily removed at the end of the season.

Plastic greenhouses are almost impossible to shade by the methods used for glasshouses. If it is intended to grow plants which require shading (the majority of pot plants, for example), it is better to use milky rather than clear plastic. An article on "Plastics for Greenhouses and Frames" appeared in the May 1960 issue of the "Journal".



[*Bandsma and Brandt*

**Snails can damage seedlings, young shoots of alpine plants and delphinium, and flowering stems of carnations and kniphofia. Put down slug bait or water the ground with a proprietary preparation of liquid metaldehyde.**

## Floral Decoration

Branches of cherry blossom can be cut now for decoration. Those which are overcrowded, crossing other branches, or growing into the centre of the tree should be chosen, so that the shape of the tree is improved rather than damaged by cutting. Branches should be either removed completely or cut back to a lateral. Any cuts an inch or more in diameter should be painted over to protect them from disease. The cut branches should be slit or hammered at the base and placed in deep, cold water overnight before arranging. Cherry blossom usually looks better alone than mixed with other flowers.

Many blue flowers are available for cutting this month, and they are beautiful with their own green foliage or mixed with white or cream flowers. The small blue daisy flowers of *Agathea coelestis* last very well in water, and the colour is unique. Babianas are a rich purple blue with sufficient red to make them a useful link in a colour scheme which embraces red, blue, and purple.

Delphinium spikes have a dignity and elegance which are outstanding. The blue shades are preferred, and they range from palest china to deep purple blue. They are lovely alone or in mass arrangements of mixed flowers. If it is found that the hollow stems do not take up water so that the tip of the spike droops, recut the stem and pour water into the hollow part, and cover with the thumb until the end of the stem is again under water. Lupins can be treated in the same way. Spike flowers should be cut when the oldest flowers, usually the lowest, are at their best, but before they begin to fade. The buds continue to open so that later, when the lower flowers have dropped, the spike can be cut down shorter and used again in smaller arrangements.

The first gladioli are now beginning to flower in warmer areas. A single spike of the large flowered kind looks well with one or two leaves in a slim, tall vase. In this way the beauty of a well grown spike can be appreciated without the distraction of other flowers in a bigger arrangement. The spike should be cut with a sharp knife so that as many leaves as possible are left to make the food which will enlarge the corm for next year's flower spike.

Ixias make excellent cut flowers and grow easily in most gardens. Inferior seedling types should be rooted out and destroyed when they are in flower, and replaced next autumn by bulbs of good varieties. One which has unusual blue green flowers is *Ixia viridiflora*.

# A Fabric Belt in Four Easy Steps

By NAOMI F. BANKS,
Home Science Instructor,
Department of Agriculture,
Auckland

A FABRIC belt made of the same material as the rest of the garment adds a neat finish to the waistline. This four-step method of making a belt is simple and quick because it is completely machine sewn and suitable for most types of fabrics.

HOME dressmakers usually find the pointed end to the belt the most difficult part to make and this method ensures a foolproof, neat finish to the point, and a belt 'that is comfortable, yet firm.

## Materials

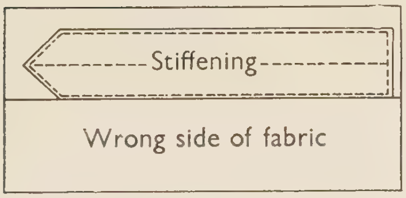
Materials required are:

A length of unboned petersham or stiffening material the desired width of the belt and 5 in. longer than the waist measurement.

A strip of fabric cut on the straight grain twice the width of the stiffening plus 1 in. seam allowance and 5 in. longer than the waist measurement.

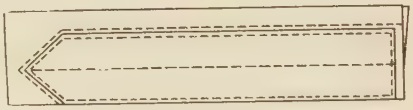
Matching thread.

### Step One



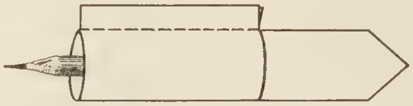
Cut one end of the stiffening to a point. Fold the fabric strip in half lengthwise and press along the fold line, thus marking the centre. With the long edge along the fold line of the covering material place the stiffening on one half on the wrong side of the fabric. Pin or tack in position. Machine stitch the stiffening strip to the fabric starting from the point and stitching along the centre of the strip, across the short edge, and then completely round the edge of the whole strip keeping as close to the edge as possible. This holds the stiffening in place and stops the finished belt from rolling up.

### Step Two



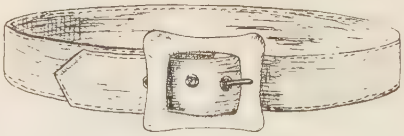
Now there is a strip of material with the stiffening firmly stitched to one half. Fold this piece of material in half lengthwise, right sides inside, and use the edge of the stiffening as a guide for folding it straight. Join the long edges together, stitching very close to the stiffening but not on it. Leave the short end open and stitch down the long side, round the point, leaving the needle in the fabric at the folded edge. Turn the belt and stitch round the point again.

### Step Three



Trim the seam allowance away, leaving ¼ in. down the sides and ⅛ in. round the point. Turn through to the right side by pushing the pointed end through the centre of the belt with the blunt end of a pencil. Press well. The belt may be left plain or it may be edge-stitched ⅛ in. from the edge.

### Step Four



Overcast the edges of the short end together and finish the belt with a covered buckle and eyelets, hooks and eyes, a bow trim, or any other suitable fastening.

## Wide Belts

For wide belts use a heavyweight stiffening and stitch it to the covering fabric with several rows of machining ½ in. apart and round the edge. Finish the belt in the normal manner.

## Heavy Woollen Fabrics

If a fabric is too bulky to use for covering both sides of a belt, use two strips of fabric, one of the heavy material and another of lining fabric, instead of the one folded piece. Stitch the stiffening to the piece of lining, leaving ½ in. seam allowance all round. Join to the heavy strip with right sides inside by stitching up one side, round the point, and down the other side. Turn through and finish in the normal manner.

## Sheer Material

Tack two layers of sheer material together or tack the sheer fabric to a piece of lining and use this piece to cover the belt.

## Shaped Belts

Use two strips of fabric for a shaped belt. Firmly stitch the shaped stiffening to the wrong side of one strip. Stitch the two strips together with the right sides inside, turn through, and finish.

◆

# Home-made Silver Dip

A DIP for removing tarnish from silver spoons and forks can be made inexpensively at home. It will not remove long-standing stains, but is quite effective in cleaning off day-to-day tarnish, such as that which comes from eggs or meat.

Dissolve one level tablespoon of salt in a large tumbler of warm water and add two or three crumpled pieces of silver paper, such as the wrapping from a cake of chocolate or a strip from a roll of aluminium foil.

After washing forks or egg spoons stand them in the dip for about half a minute, then rinse and dry them. The silver is not harmed in any way, and though it is not polished, keeping it free of tarnish lengthens the period between polishings.

*—MAUD B. STRAIN,*
*Home Science Instructor,*
*Department of Agriculture,*
*Dunedin*

◆

# *Care and Management of Your Electric Range*

## *with Cooking Guides and Menus*

By NAOMI F. BANKS,
Home Science Instructor,
Department of Agriculture,
Auckland

**AN efficient electric range is an asset in any home, and correct management of it whether it is a new purchase or an older model, will ensure the best results every time you cook.**

THE efficient working life of an electric range depends largely on the care taken of it. Regular weekly cleaning is necessary to keep it in good condition and if simple precautions are taken, this task need not be long and tiring.

Always remove spilt food as soon as possible, so that it does not become baked on to the enamel and do not let fat deposits build up in the oven as they affect the oven's efficiency, tend to give a bad flavour to the food cooked, and are the main cause of fires in the oven. Use a covered roasting dish and a covered casserole for cooking meat to prevent the fat splashing the oven walls.

### To Clean the Range

For safety's sake always disconnect the power from the range by turning off the wall switch or, where there is no wall switch, by removing the supply plug from its wall socket. For your own sake always clean the range while it is lukewarm, as the grease can then be wiped off more easily.

Use hot soapy water, mild abrasives, soft cloths and brushes. Avoid harsh abrasives or metal scourers which scratch the surface of the enamel, making subsequent cleaning more difficult. Grease clings to a scratched surface but slides off a smooth one.

**Enamel**

Wipe the outside enamel with a soft cloth wrung out in hot, soapy water, then repeat the process with clean warm water.

**Top Elements**

**Solid plate type of element:** Wipe with a damp cloth while the plate is still warm and let the heat of the plate dry it thoroughly. To prevent rust, which in time pits the surface, rub the elements frequently with some unsalted fat or oil. If the surface is already rusted, rub it gently with a fine-grained emery paper using a

3341

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circular movement, then wash clean and rub with fat or oil.

**Open coil type of element:** The under plate must be kept shiny, as it reflects the heat back from the element to the pan. If any liquid boils over on to the under plate, wipe it up quickly before it hardens and stains the plate. A piece of aluminium foil placed over the plate under the coil element catches the drips and can be renewed whenever necessary, but make sure that the foil does not touch the coil or any wires.

### Oven

Remove all oven racks, slides, and the drip tray and wash in hot, soapy water. Rinse, dry well, and place in the sun to air. It is not necessary to remove the elements unless the enamel under them is very greasy.

Wipe out the oven with warm soapy water, being careful not to splash the elements. A few drops of ammonia in the water helps remove grease, and stubborn marks may be rubbed with a mild abrasive. For particularly obstinate grease and stains pour half a cup of household ammonia into a bowl and leave in the warm oven for several hours or place an ammonia-soaked cloth in the oven for some time. The fumes from the ammonia will loosen grease and burnt-on food; then a mild abrasive and soap and water treatment will result in a bright, shiny oven.

If there is a glass window in the oven door, keep it clean by rubbing with a damp cloth dipped in baking soda.

Rinse the oven with clean warm water, dry with a soft cloth, and leave the door open to air the oven thoroughly. This simple care regularly is all that is necessary.

## MANAGEMENT OF THE OVEN

Though there are a wide variety of electric ranges available in New Zealand, they can be divided into three main types:

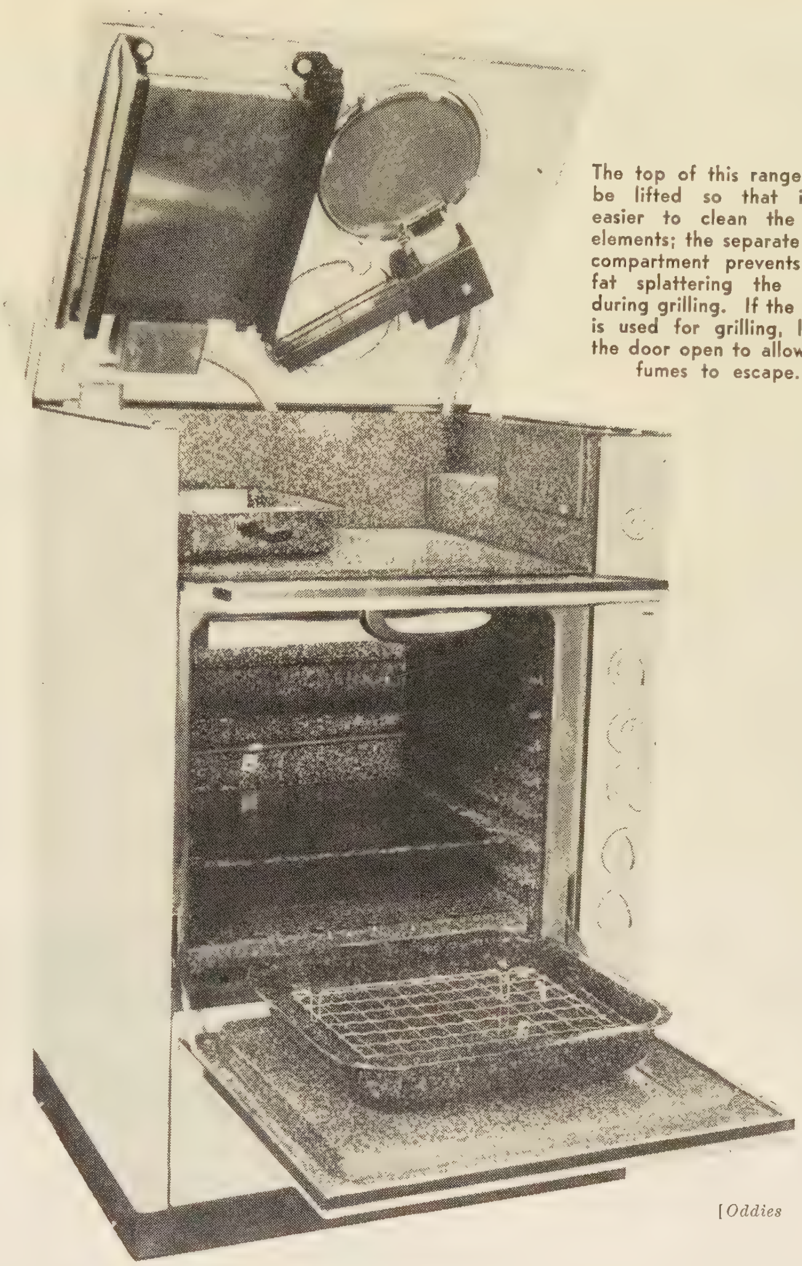
1. With top and bottom elements separately controlled by switches or switches and a thermostat.
2. With top and bottom elements controlled by a thermostat only.
3. With side elements usually controlled by a thermostat only.

### Preparation

Remove any trays and racks not in use, as extra trays or racks in the oven prevent free circulation of the heated air and the cooking will be uneven. Place the racks in the required position and close the oven door.

### Pre-heating

Food is cooked largely on stored heat derived from pre-heating the oven and maintained by a low heat in the bottom element or side elements, and good oven insulation.



The top of this range can be lifted so that it is easier to clean the top elements; the separate grill compartment prevents hot fat splattering the oven during grilling. If the oven is used for grilling, leave the door open to allow the fumes to escape.

[*Oddies*

To pre-heat the oven set the switch for the top and bottom elements to high or set the thermostat to the desired pre-heat temperature. It is advisable to add 50 degrees to the recommended baking temperature when pre-heating the oven. This compensates for the 25 to 50 degrees loss of heat when the oven door is opened. When the required temperature has been reached or the light on the thermostat has gone out turn the top switch off and the bottom element to low or set the thermostat back 50 degrees to the baking temperature and wait two minutes for the heat to settle before placing the food in the oven. It should never be necessary to cook with the top element on if the oven has been pre-heated sufficiently.

### The Thermostat

When the thermostat is set to the temperature wanted a light comes on indicating that the oven elements are on. Some thermostats have one light for both elements while others have a light for each element.

When the light is on while the oven is pre-heating both elements will be on high. When the set temperature is reached, for example 400 degrees, the light will go out, but when the temperature drops below 400 degrees the bottom element will automatically switch on to low to boost the heat and the light will come on, if there is only one light, or the bake light only, if there is a bake and grill indicator, showing that only the bottom element is on. In some types of electric range the outer coil of the top element comes on with the bottom element while the heat is being boosted, and this can cause burning if care is not taken with placing the food in the oven. (See chart at right.)

The temperature drops 25 to 50 degrees each time the oven door is opened, so it is important to resist the temptation to "see how that cake is getting on".

## Stored Heat

A well insulated oven holds its heat with all the switches off for 10 minutes and then the heat drops gradually until it is cold. This drop takes approximately one hour. It is economical to make use of this stored heat for all types of cooking, especially baking.

Any food requiring long, slow cooking, such as roasts or casseroles, can be finished with both switches or the thermostat turned off for the last half hour of the cooking time. Cakes can have the switch turned off for the last quarter of the cooking time, for example, a Christmas cake taking four hours to bake, could be cooked on stored heat for the last hour, or a one-hour cake be finished on stored heat for a quarter of an hour. Small goods taking 10 to 15 minutes, such as scones, puff pastry, biscuits, or sponges, can be completely baked with the switches or the thermostat off, provided the oven is pre-heated an extra 50 degrees. Meringues, pavlova, or shortbread, which require long slow cooking, can be dried out on stored heat after quarter of an hour with the switches on.

## Cooking Guides

The temperatures and times for cooking recommended in the tables are a guide only and must be adapted to suit different ranges and individual cooking methods.

## Meals Entirely Oven Cooked

Completely oven-cooked meals are a boon to the busy housewife. They can be prepared all at once, saving time and energy, and can be cooked and served in the same dish, saving extra work and dishes. It is economical to cook the whole meal with only the oven heat and once the meal is in the oven your work is over, giving an extra hour to get on with some other job.

Planning is necessary to make these meals successful. When planning a menu choose dishes that cook at the same temperature and take approximately the same cooking time. Some menus are suggested on page 319. They should be planned to provide nutritionally balanced meals and the following points should be considered:

Texture: contrast crisp with soft

Flavour: contrast bland with strong

Colour: avoid if possible meals that are all brown or all white; a colourful garnish such as tomato or parsley adds interest

## Guide to Positions, Times, and Temperatures for Oven-cooked Foods

### I. WITH TOP AND BOTTOM OVEN ELEMENT (SWITCHES OR THERMOSTAT CONTROL)

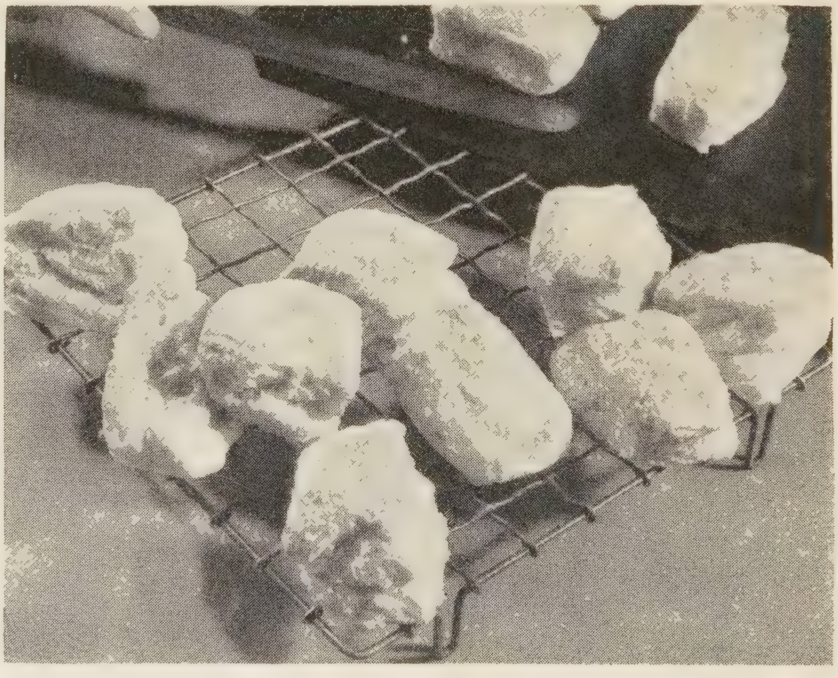
| Food | Baking temperature (degrees) | Approximate time | Ideal position in oven |
|---|---|---|---|
| Scones | 450 to 500 | 8 to 15 minutes | Second runner from top |
| Pastry | 400 to 500 | 10 to 15 minutes | Second or third runner from top |
| Biscuits | 350 to 450 | 10 to 30 minutes | Third runner from top |
| Sponges | 375 | 15 to 20 minutes | Third runner from top |
| Small cakes | 400 to 450 | 10 to 20 minutes | Third runner from top |
| Butter cakes | 350 to 400 | ¾ to 1½ hours | Centre |
| Rich cakes | 300 to 350 | 1½ to 4 hours | First runner below centre |
| Bread | 400 to 500 | 1 hour per 2 lb loaf | Centre |
| Meringues | 250 to 300 | 1 hour | First runner below centre |
| Roasts and casseroles | 350 to 400 | Depends on size | First runner below centre |

### 2. WITH SIDE ELEMENTS

| Food | Baking temperature (degrees) | Approximate time | Ideal position in oven |
|---|---|---|---|
| Scones | 500 to 550 | 8 to 12 minutes | Second runner from top |
| Pastry | | | |
| Puff | 525 | 10 to 20 minutes | Second runner from top |
| Short | 450 | 20 minutes | Centre |
| Biscuits | 350 to 450 | 10 to 30 minutes | Second runner from top or lower |
| Sponge | 400 | 15 to 20 minutes | Second runner from top |
| Small cakes | 400 to 500 | 10 to 20 minutes | Second runner from top |
| Butter cakes | 350 to 400 | ¾ to 1½ hours | Centre |
| Rich cakes | 300 | 1½ to 4 hours | Centre or one below |
| Bread | 450 to 500 | 1 hour per 2 lb loaf | Centre |
| Meringues | 250 to 300 | 1 hour | Bottom runner |
| Roasts and casseroles | 400 to 450 | Depends on size | Centre |

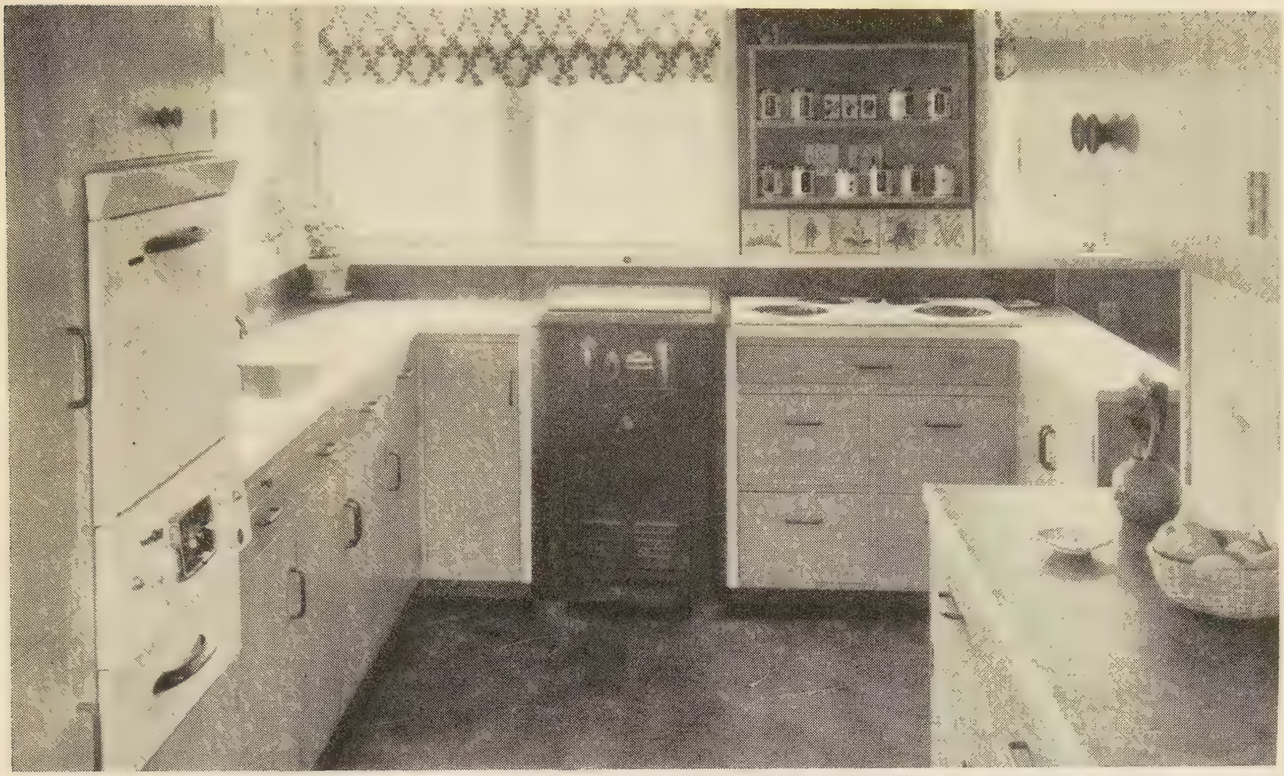
### 3. THERMOSTAT CONTROL WITH THE OUTER COIL OF THE TOP ELEMENT COMING ON WITH THE BOTTOM ELEMENT TO BOOST HEAT

All food is cooked on the third and fourth runner from the bottom. Place aluminium foil over the top of fruit cakes for the first two hours.



*[Sparrow*

Scones perfectly baked with stored oven heat. Any quick cooking foods can be baked with the oven switches turned off with equally good results.



[*Sparrow*

An oven set into the wall at a convenient working height eliminates stooping and makes cleaning less tiring. The separate counter cooking top placed near the breakfast nook completes an efficient and practical cooking arrangement.

## Some Parts of an Electric Range

### Solid Plate

A heavy cast iron top element; slow heating, but retains heat for some time.

### Open Coil

A tubular type element used on the top of the range which gives immediate heat but does not retain heat.

### Thermostat

A temperature control which switches off the oven elements when a pre-set temperature is reached and switches them on when the temperature drops below the pre-set temperature.

### Simmerstat

A six-heat switch usually used to control a top element and marked in the same way as a thermostat to give selected heats.

### Minute Minder

A timer which can be set to ring as a reminder after a selected time has expired.

### Automatic Timing Clock

An automatic device which may be used to pre-select the starting and finishing times of oven cooking.

Variety: choose a variety of vegetables and cook them in different ways.

For instance, bake corn cobs in their leaves. Strip the leaves off just before serving, and the corn will be tender and juicy.

Carrots and parsnips cut into strips and cooked in a covered dish with a little butter and sugar or golden syrup are different.

Halved pumpkins with the seeds scooped out, the hollow spread with softened butter and salt and pepper, and baked in the shell, or butternuts, baked whole, have an excellent flavour.

Potatoes cooked in their jackets are always popular, but they are equally good peeled, rubbed with vegetable oil, and placed on the oven rack or in a dish to bake to golden crispness. Another interesting way with potatoes is to layer fine slices in a shallow casserole dish with a little milk or cream, salt and pepper, and a few knobs of butter. Cover the dish and bake for about an hour.

Any root vegetable can be cooked in the oven in a covered dish with a little water.

Green vegetables require quick cooking to retain their valuable

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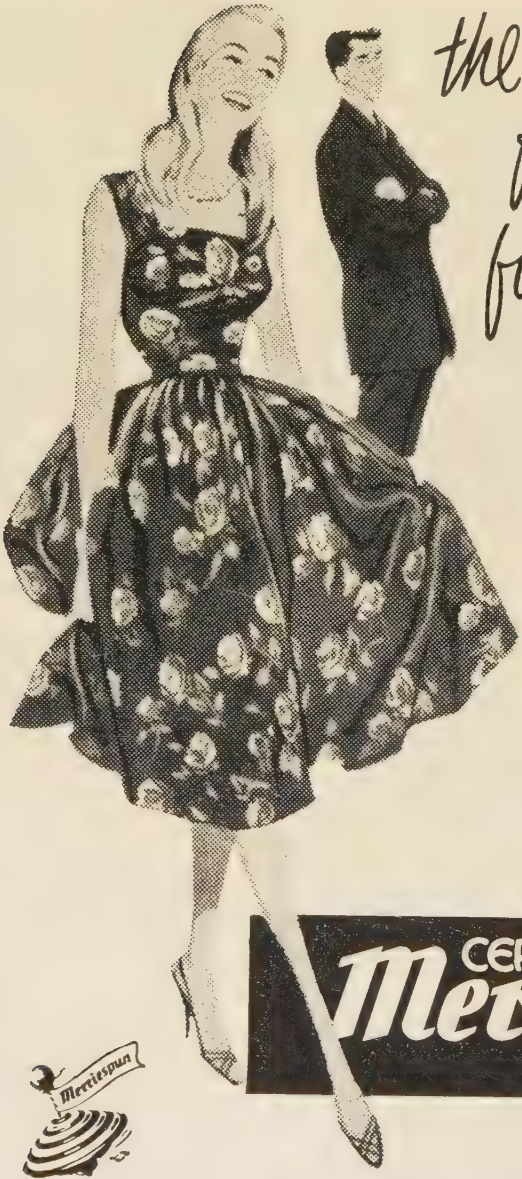

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vitamins and minerals and therefore should not be cooked in the oven. Serve a green salad or a green vegetable with oven meals making a nutritionally adequate meal as well as a change of texture.

## Arrangements in the Oven

Oven-glass and earthenware dishes are attractive and practical, as several foods may be cooked and served in the same dish. Use covered dishes for all vegetables except baked or roast ones, and cover meat casseroles.

Adjust the racks to the correct position in the oven and pre-heat to the required temperature. As a general rule the oven should be pre-heated 50 degrees higher than the baking temperature and the thermostat set back to the correct temperature two minutes before the food is put in the oven.

As the hottest part of the oven is the top, quick-cooking foods should be placed on the top rack and slow-cooking ones on the low rack. Most cakes should be placed in the centre.

Make sure that the dishes do not touch each other or the walls of the oven, as for even cooking the air must circulate freely. Place dishes which require attention during cooking at the front of the oven.

## Suggested Menus for Completely Oven-cooked Meals

The following menus are a guide for planning complete oven-cooked meals and are also suitable for use with an automatic timing clock. Some of the more unusual pudding recipes are given at the end.

**1. Temperature 400 degrees F, time 1 hour**

Liver and bacon casserole
Baked potatoes
Baked stuffed tomatoes
Corn baked in its leaves
Fresh fruit salad

**2. Temperature 400 degrees F, time 1 hour**

Sausage and apple casserole
Baked potatoes
Baked baby beets
Raw celery sticks
Fresh fruit and cheese

**3. Temperature 375 degrees F, time 1 hour**

Beef casserole
Baked potatoes
Roast onions
Lettuce and tomato salad
Honey-baked pears

**4. Temperature 375 degrees F, time 1 hour**

Beefsteak and kidney pie
Baked potatoes
Glazed parsnips
Green peas
Stuffed apples with cream

**5. Temperature 375 degrees F, time 1 hour**

Stuffed baked fish
Baked kumaras
Celery in cheese sauce
Tossed green salad
Rhubarb Canadian crumble

**6. Temperature 375 degrees F, time 1 hour**

Baked meat patties with tomatoes
Small potatoes cooked in oil
Baked whole butternut
Cucumber-tomato salad
Baked jam roll

**7. Temperature 350 degrees F, time 1 hour**

Baked pork chops with apple rings
Scalloped potatoes
Baked pumpkin
Cabbage and pineapple salad
Baked caramel custard

**8. Temperature 350 degrees F, time 1½ hours**

Chicken casserole
Stuffed baked potatoes
Mixed vegetable custard
Tossed green salad
Pineapple crisp

**9. Temperature 350 degrees F, time 1 hour**

Savoury baked mince with potato topping
Baked marrow
Glazed carrots
Beans
Pear ginger upside-down cake

**10. Temperature 350 degrees F, time 45 minutes**

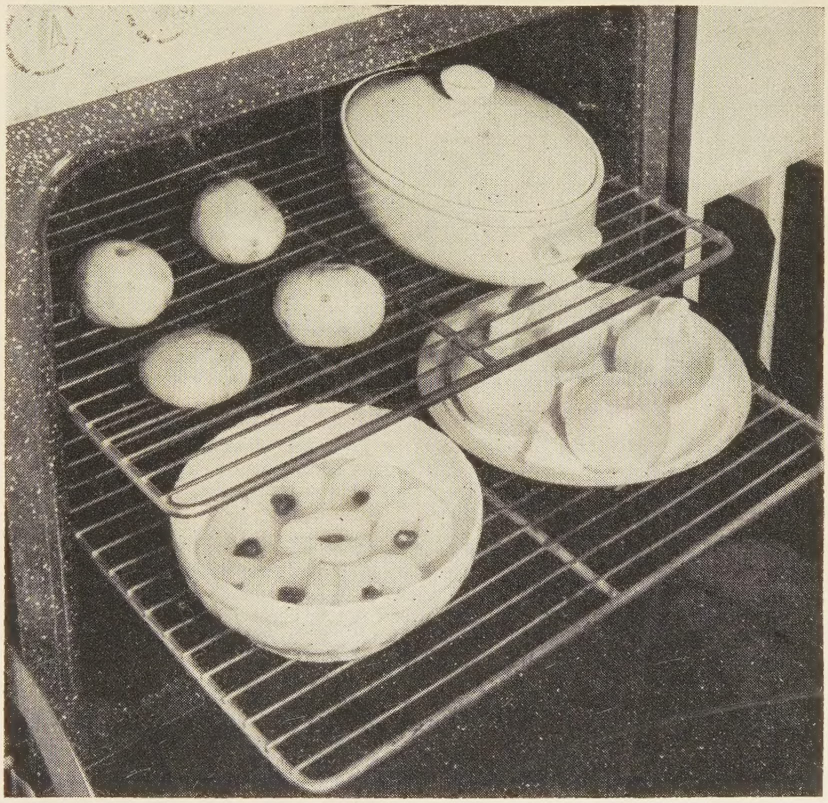
Macaroni cheese
Baked tomatoes
Lettuce salad
Apricot dumplings

## Recipes

### Honey-baked Pears

8 pear halves (tinned or fresh and ripe)
¼ cup of lemon juice
½ cup of honey (melted)
1 teaspoon of cinnamon
2 tablespoons of butter

Arrange the pears in a shallow ovenproof dish. Pour the honey and lemon juice over them, sprinkle with cinnamon, and dot with butter. Bake at 375 degrees F for one hour.



[*Sparrow*

Menu 3 placed in the oven ready for cooking. The scrubbed and oiled potatoes on the rack and the beef casserole in the covered ovenproof dish require a higher temperature than do the pears and onions and are therefore placed near the top, which is the hottest part of the oven.

### Apricot Dumplings

½ lb of sweet short pastry
Apricot halves or slices
Cinnamon
Sugar

Roll the pastry thinly and cut it into 8 in. squares. Place the apricot halves or slices on each square and sprinkle with sugar and cinnamon to taste. Moisten the edges of the pastry and pinch the edges together to form a ball. Place in a greased baking dish.

Leave plain or make a syrup of 1½ cups of sugar and 2 cups of water. Boil the sugar and water together for 5 minutes, add 2 oz of butter, and pour over the dumplings. Bake at 350 degrees F for 45 minutes.

### Pear Ginger Upside-down Cake

**Cake Mixture**

1 breakfast cup of flour
1 teaspoon of soda
1 teaspoon of ginger
1 teaspoon of cinnamon
¼ teaspoon of nutmeg
¼ teaspoon of salt
1 egg
½ cup of brown sugar
2 tablespoons of golden syrup
½ cup of milk
2 oz of melted butter

Sift the flour, soda, spices, and salt together. Beat the egg and brown sugar until thick and creamy, add the golden syrup and beat. Fold in the sifted flour mixture alternately with the milk and butter.

Arrange steamed or preserved pear halves with the cut side down in the bottom of a baking tin and cover with a syrup made with 1 tablespoon of butter, 1 teaspoon of water, and 2 tablespoons of brown sugar. Spoon the cake mixture over this and bake at 350 degrees F for one hour.

### Rhubarb Canadian Crumble

Fill a pie dish with lengths of rhubarb, sprinkle with sugar to taste, and cover with the following topping.

3 oz of flour
1½ oz of butter
2 oz of sugar
¼ teaspoon of salt

Rub the butter into the flour until the mixture resembles fine breadcrumbs, then add the sugar and salt, mix well, and sprinkle over the fruit. Bake at 375 degrees F for one hour.

### Baked Jam Roll

½ lb of short or flaky pastry
Jam

Roll the pastry thinly. Warm the jam and spread on the pastry. Roll up as for a sponge roll. Bake at 375 degrees F for half an hour.

### Pineapple Crisp

2 eggs
8 oz of sugar
1 cup of drained, crushed pineapple
½ cup of chopped walnuts
3 oz of flour
1 teaspoon of baking powder
¼ teaspoon of salt
1 teaspoon of vanilla essence

Beat the eggs until fluffy. Gradually add the sugar, beating constantly until the mixture is thick and ivory coloured. Fold in the pineapple, nuts, and vanilla. Sift the dry ingredients and fold them into the mixture, mixing gently but thoroughly. Pour into a greased 12 in. x 8 in. baking dish. Bake at 350 degrees F for half an hour.

Cool, and serve with cream and butterscotch sauce, using pineapple juice instead of water in the sauce.

When using this as part of menu 8, start all the prepared dishes baking at the same time and remove the pudding after half an hour or when done.

# *Crisp, Crisp Biscuits*

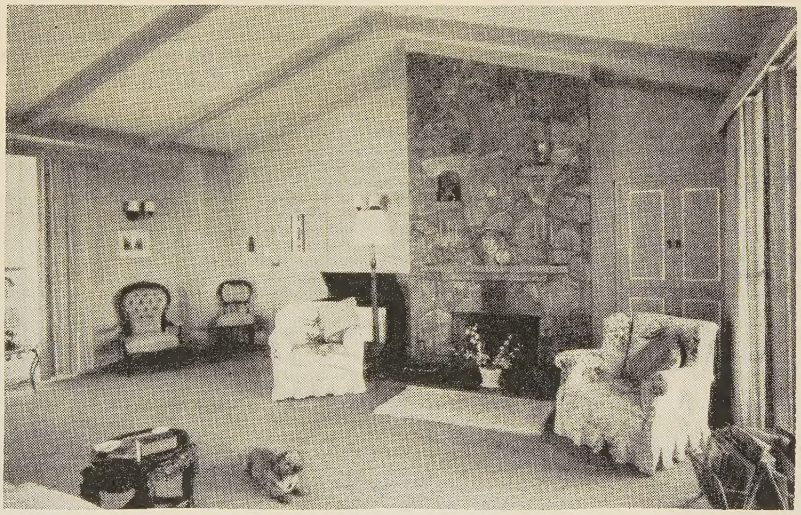
THE word biscuit means twice cooked and the secret of really good crisp biscuits is to cook them twice.

Two to three minutes before the biscuits have finished cooking remove them from the oven, let them cool on the tray for five minutes, then replace them in the oven to complete baking.

Soft biscuits, either home made or bought, can be recrisped by placing them in a moderate oven to heat through.

—*NAOMI F. BANKS,*
*Home Science Instructor,*
*Department of Agriculture,*
*Auckland*

# *Rooms Should Have One Focal Point*



[*Sparrow*

TO have a focal point in a room is perhaps the most important rule for successful interior decorating. It means accenting one or two outstanding points and it is the only way that really interesting and distinctive decorating effects can be achieved.

A fireplace is a logical choice for a focal point as with the attractive fireplace of Drury stone in the illustration, but a beautiful picture, a piece of furniture, or a window with a view may be selected as the centre of interest. A room without a fireplace need not be "unfriendly" if attention is given to providing a point of interest such as an arrangement of pictures or ornaments and subordinating other parts of the room to it. Equal values in furniture, colour, and texture result in a negative-looking room.

Decide on the focal point first so that furniture groupings can be arranged round it. Fabrics can play an important part in focusing interest on one point in a room—an otherwise unnoticeable window can become an outstanding focal point through the use of a distinctive window treatment.

—*JANET W. ROBERTS, Home Science Instructor,*
*Department of Agriculture, Auckland*

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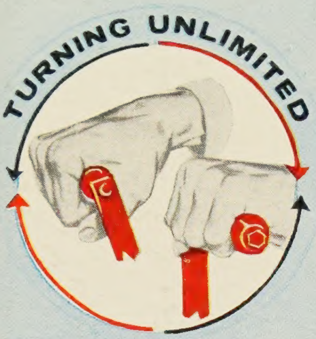

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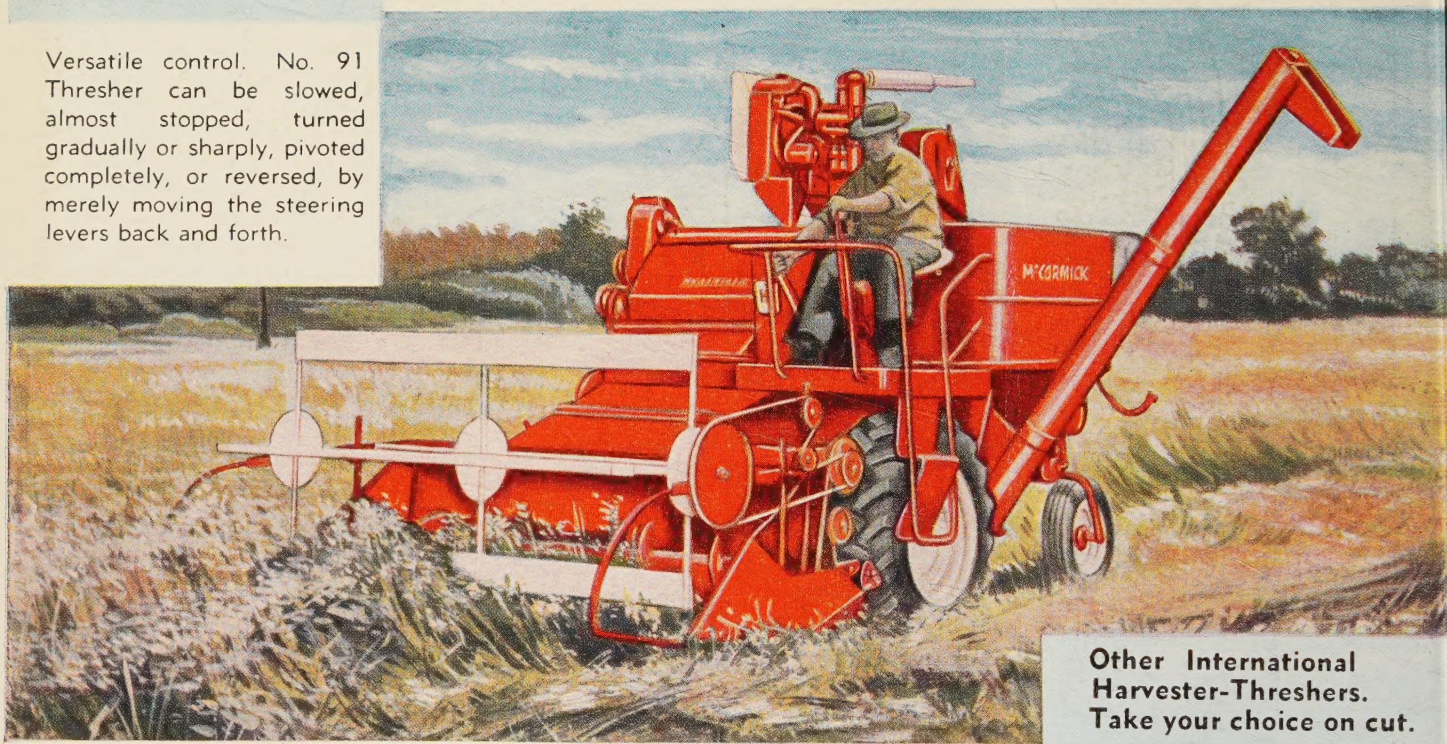

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